SOCIAL STATISTICALIZATION: NUMBER, STATE, SCIENCE

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This dissertation explains why social statisticalization—a form of rationalization that influences society through the production, consumption, and dissemination of statistical numbers—is possible. In this general social process, people increasingly depend on statistics to make decisions, justify practices, and update knowledge. As a result, social statistics are able to change human behavior, reconfigure social relations, shape political discourse, and constitute cultural norms. Ultimately, statistical rationality not only reproduces but also reinforces a variety of defining characteristics of modern society such as efficiency, standardization, formalization, calculability, predictability, and the replacement of humans with technologies.

In Chapter 1, I ask: Why do modern states routinely keep official statistics on their societies? This chapter presents arguments about how gathering official statistics as a technology of state power facilitate modern states' engagements in democratic state building, capitalist state building, colonial, and post-colonial state building, and war making in world society. These arguments are illustrated by historical case studies and tested by cross-national longitudinal analyses of the worldwide establishment of National Statistical Systems (NSSes) in 157 countries from 1826 to 2010. The analyses demonstrate that, although there are regional and temporal variations, democratization, capitalist development, aggregate war onsets, colonization, and inter-governmental linkages generally prompt modern states to establish NSSes. To get their hands on societies, modern states need to collect official statistics to keep societies under their watchful eyes.

In Chapter 2, I ask: How does the statistics profession become globally institutionalized? This chapter analyzes the worldwide founding of national statistics associations from 1833 to 2011, arguing that the statistics profession emerged in the nineteenth-century West and spread to other parts of the world in the twentieth century. Based on an integrated institutionalist framework, I conduct event history analysis to demonstrate that the process of the global professionalization of statistics is determined by both national characteristics and the world polity. On one hand, democracy and national material capacity generally encourage the establishment of the statistics profession, and the effect of colonialism is in the opposite direction. On the other hand, intergovernmental organizations create a world polity in which the statistics profession is able to be diffused and constructed. Separate analyses for the pre-1945 and post-1945 eras indicate that, while there are regional and temporal variations, the world polity is a robust factor throughout the entire period of analysis.

In Chapter 3, I ask: Why does the American state routinely collate statistical data on crime? Suprisingly, the relationship between state and criminal statistics is undertheorized. This chapter develops a theoretical framework that triangulates criminal statistics, criminological knowledge, and state power. It argues that collecting criminal statistics is a political instrument for the state to deploy its symbolic power, biopower, and disciplinary power. This theory is applied to examining the American state's policy decisions about the institutionalization of systematically collecting criminal statistics. It demonstrates how criminal statistics were seen as useful in constructing a problem of crime, keeping the population under criminal surveillance, and facilitating imposing discipline and punishment for criminals.

In Chapter 4, I ask: How does the general public react to statistical numbers? Public opinion polling has been institutionalized in American politics. Although previous research indicates that

the American public has been increasingly skeptical about opinion polls, we surprisingly know little about where this skepticism originates socially. To fill this gap, this article mainly examines whether partisanship and ideology shape the American public's evaluation of the credibility of polling. Analyses of cross-sectional surveys demonstrate that even though most Americans trust polling, Republicans and conservatives are significantly less likely than Democrats and liberals to trust the social impact, value, and accuracy of opinion polls. Moreover, political awareness, measured by college education, also predicts the public's distrust of polling. Further analysis suggests that public distrust of polling is to varying degrees associated with distrust of science and the news media. These findings are used to discuss broader sociopolitical implications for contemporary American democracy, especially in the context of the rise of right-wing anti-establishment movements.

BIOGRAPHICAL SKETCH

Jing-Mao Ho was born in Taitung, Taiwan. He received a BS in Information Engineering from I-Shou University, an MS in Computer Science and an MA in Sociology from National Taiwan University. His research interests include political sociology, science, technology, & knowledge, comparative and historical sociology, global and transnational sociology, the sociology of culture, statistical methodology, computational social science, social theory, theory of computation, algorithm analysis, and machine learning. He uses qualitative, quantitative, and computational methods to analyze archival, organizational, survey, or textual data. In the Fall of 2019, he will begin an appointment as Visiting Assistant Professor of Data Science at Utica College.

For my parents: San-Pen Ho and Chun-Tao Li

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CHAPTER 1

Keeping a Watchful Eye on Society: State Building and the Worldwide Establishment of National Statistical Systems, 1826-2010

> *A thoroughly legible society eliminates local monopolies of information and creates a kind of national transparency through the uniformity of codes, identities, statistics, regulations, and measures.*
>
> —James Scott (1999:78), *Seeing Like a State*

> *State building, as Charles Tilly has emphasized, has historically entailed a series of "extractive and repressive" tasks such as the organization of the military, tax system, and police. The development of statistical systems represents a subordinate, auxiliary task of the same kind. I have already mentioned the historical connection of censuses to conscription, and tax assessment. In a sense, all three are extractive—of men, money, and information.*
>
> —*Paul Starr* (1987:15–16)*, The Sociology of Official Statistics*

Official statistics are everywhere. They are produced nation-state governments to describe almost anything one can think of, such as births, deaths, diseases, marriages, unemployment rates, crime, family income, health, education, gender, race, ethnicity, and immigrants. These official numbers can be easily seen and very often cited in the mass media, popular magazines, best-selling books, blog posts, and research reports. While not always trusted by the public, official statistics permeate nearly every aspect of social life, becoming an integral part of society.

The ubiquity of official numbers begs the question about their raison d'être: Why official statistics? One of the widely accepted views holds that official statistics count because they are indispensable and beneficial to society. For instance, the United State government claims that gathering official statistics mainly performs "evidence-building functions" and those statistics "provide critical support for both public and private-sector policymaking, program management,

and program evaluation";[1]the UK Statistics Authority states that "[o]fficial statistics are for the benefit of society and the economy as a whole."[2] These official statements alike generally perceive official statistics as contributing to the survival, maintenance, and integration of society as a whole, thereby to a large degree resonating with the functionalist perspective of government (Almond and Powell 1966). Yet, this point of view only serves as raison d'état for, rather than a sociological explanation of, the existence of official statistics.

But while the functionalist view of official statistics is unsatisfactory, the use of official statistics to varying degrees has been one of the methodological underpinnings for social science since its birth in the nineteenth century. For instance, Emil Durkheim's (1895, 1897) use of official data for developing his classic arguments about suicide is one of the most notable examples. Yet, not only have Durkheim's work on suicide and his methods been challenged (e.g., Douglas 1970; O'Donnell and Farmer 1995), but scholars from different epistemic camps also have more broadly debated the appropriateness of the use of official numbers in social scientific research (e.g., Bulmer 1980; Hindess 1973; Irvine 1987; Kitsuse and Cicourel 1963).

More recently, students across social and human science disciplines have moved beyond the methodological and epistemological debates over the use of official statistics, critically suggesting that statistical numbers—treated as an explanandum in this vein of research—are constructed through complex, social processes (e.g., De Santos 2009; Desrosières 2002a; Espeland and Stevens 2008; Porter 1996b). This line of inquiry was accompanied by the rise of social studies of science and technology, some of which devoted their attention to the history of statistics as both a mode of thinking and as a scientific discipline (e.g., Daston 1988; Desrosières 2002a; Gigerenzer et al. 1990; Hacking 1975, 1990; MacKenzie 1981; Porter 1988; Schweber

[1] https://obamawhitehouse.archives.gov/sites/default/files/omb/assets/information_and_regulatory_affairs/statistical-programs-2017.pdf, p.3.
[2] https://www.statisticsauthority.gov.uk/about-the-authority/

2006). Whereas these studies address myriad dimensions of statistical numbers, statistical techniques, and statistical knowledge, the common ground among them is their constructivist approach, which is, directly or indirectly, in disagreement with the functionalist view of official statistics.

Against this intellectual backdrop, a growing body of literature also has centered on cognitive or cultural impacts of statistical numbers, arguing that statistics are not only socially constructed but also able to "shape society as they measure it" (Alonso and Starr 1989:2). For instance, the concept of "statistical discrimination" refers to cognitive biases that substituting an individual's characteristics for a group's averaged ones (Bielby and Baron 1986). More recent research has focused on census statistics, examining their social constructions and cultural consequences. For example, scholars point out that the ethno-racial classifications that are imposed in censuses has involved complicated political contestation and sparked controversies and debates in the United States (Anderson 1990a; Hochschild and Powell 2008; Lee 1993; Mora 2014). By reading census statistics, the surveyed (people) starts to adopt those categories that are used by surveyors (the state); people's awareness of being categorized in certain ways "may even lead them to alter their behavior" (Hacking 1997:15, quoted in Loveman 2014:15). More generally, scholars also criticize that, in Western democracies, the instrumental use of statistical surveys engenders a simpleminded and one-dimensional public sphere in which nuanced, sophisticated political voices are reduced to narrow, quantitative measures (Bourdieu 1979; Habermas 1991; Herbst 1993; Igo 2007)

The constructivist approach to, and attention to the cognitive impact of, statistical numbers in general have contributed to the advancement of our understanding of official statistics in particular. To be sure, official statistics are hardly neutral representations of social life. And the

discourses based on official numbers are able to influence people's knowledge about society, which can result in the reproduction of certain forms of social inequality. However, the focus on the cultural aspect may seem to obscure the fact that statistical numbers are usually systematically gathered and collated by powerful, authoritative organizations that have sufficient resources. In the case of colleting official statistics, it is only the state that has the power and resources needed for doing so. In this regard, it is important to "bring the state back in."

In *The Sociology of Official Statistics,* Paul Starr (1987:15–18) argues that, for the purposes of conscription and taxation, official statistics are gathered by the state to help extract resources from society. Ultimately, official statistics are used to assist the state to establish financial and political domination. Yet, although this argument has directly pointed to the significance of the state for investigating the existence of official statistics, this topic has been given little attention in research on states. When exploring the issue of resource extraction, most studies of state building primarily take a Weberian approach, focusing on materialistic aspects, such as physical violence, military force, and social movements. While some scholars indeed have shed light on the dialectic between state and census in particular (for a review, see Emigh, Riley, and Ahmed 2015:5–12; Ventresca 1995a), censuses hardly represent the whole picture of the modern state's collection of official statistics, and a variety of official numbers are not gathered through census taking. Overall, there is still short of a comprehensive theoretical framework for understanding the relationship between state and official statistics in general.

How, then, should the modern state's routine gathering of official statistics be explained? To address this issue, it is necessary to first identify the explanandum in question. In his efforts to call sociologists' attention to official statistics, Starr (1987:8–9) suggests, among others, asking: What causes statistical systems to be established? By "statistical systems" he refers to systems

built "for the production, distribution, and use of numerical information." Following this definition, I argue that, in the context of state building, these statistical systems are National Statistical Systems (NSSes). An NSS is part of the administrative body of a state with a very clear mission: keeping official statistics.[3]For example, the Federal Statistical System as the NSS of the United States is composed of over 100 government agencies, including the Census Bureau, the Bureau of Labor Statistics, the Bureau of Economic Analysis, the National Center for Education Statistics, and so on.[4] In the United Kingdom, it is the UK Statistics Authority that is in charge of gathering official statistics on British society. Most importantly, according to the United Nations (UN), 187 of 196 countries have an NSS.[5] In other words, keeping official statistics has been a matter of routine for nearly all modern states around the world. Thus, to explain what causes statistical systems to be founded, it is critical to account for their worldwide establishment.

This article both historically and quantitatively examines the establishment of NSSes to address the question of why modern states keep official statistics on their societies. This empirical investigation is based on a theoretical framework that articulates the inherent relationship between official statistics and state-building. I first critically review and reformulate relevant theoretical work, then conceptualizing keeping official statistics as a *technique of state building*. Within this conceptual framework, the founding of an NSS generally represents the state's efforts to institutionalize and routinize its practices of the statistical technique of state power. After briefly introducing NSSes, this article uses historical examples to develop arguments about the relationship between NSS establishment and state building. More

[3] https://unstats.un.org/unsd/dnss/gp/fundprinciples.aspx
[4] https://obamawhitehouse.archives.gov/sites/default/files/omb/assets/information_and_regulatory_affairs/statistical-programs-2017.pdf,
[5] https://unstats.un.org/unsd/dnss/default.aspx

specifically, I shall specify how collecting official statistics as statecraft figures in democratic state building, capitalist state building, war making, colonial state building, and state building in world society. These arguments are substantiated by historical cases and further tested by analyzing a cross-national, longitudinal dataset with information on 157 countries from 1826 to 2010. GEE proportional hazard models are employed to examine how the timing of the establishment of NSSes is influenced by the structural, sociopolitical conditions mapped onto the arguments I develop, including democracy, capitalist development, war, colonialism, and intergovernmental connectedness. I also conduct separate analyses of the periods of 1800-1900 and 1901-2010. I find that that in general democratization, increasing capitalist development, war, colonization, and ties to the world polity precipitate the establishment of NSSes. Periodizd analyses demonstrate that, in the nineteenth-century, wars drove state builders to gather official statistics regularly and routinely; in the twentieth-century, democratization, a growing economy, colonialism, and intergovernmental organizational connections were the salient forces driving state builders to institutionalize the collection of official statistics by founding NSSes.

OFFICIAL STATISTICS AND STATE BUILDING

As mentioned above, Starr (1987) has argued that it is state building that creates a need for having official statistics collected. But why do official statistics matter to state building? First of all, state building is a set of processes in which a government implements "extractive and repressive" activities (Tilly 1975, quoted in Starr 1987:15) and moves towards the centralization of state power (Giddens 1985; Mann 1984). The accumulation, concentration, and exercise of state power require the assistance of technologies that can facilitate resource extraction and social control (Mann 1984; Rueschemeyer, Evans, and Skocpol 1985; Skocpol 1979; Tilly 1975,

1992). For instance, patronage is perceived as one of the efficient techniques used by state builders for co-opting local oppositional elites (Bearman 1993; Gould 1996). While tools of resource extraction are of paramount importance to state builders, *information extraction* also plays a necessary role in state building because to govern its society the state usually takes a first step: gathering information (Bourdieu 1994, 2015; Giddens 1985; Higgs 2001; Scott 1999).

Official statistics are a special form of information about a state's society. Scott (1999:78–79) argues that administering society requires a particular type of knowledge that "implies a viewer whose place is central and whose vision is synoptic" and is "designed to provide authorities with a schematic view of their society." The production of this type of information entails five steps: observation, categorization, freezing, aggregation, and standardization (Scott 1999:79). In light of these steps, it can be said that the kind of knowledge that official statistics provide is the very type of information that the state needs in terms of managing society. As Bourdieu (2015:214) forcefully argues:

> Statistics make it possible to totalize information from individuals and obtain from this, by totalization, information that none of the individuals who provided the basic information have. Statistics is precisely a transcendent technique that makes it possible to effect a totalization (everything I am saying about the state holds good also for statistics), but it is not easy to have the means to "raise" information.

For states, to gather totalized information—information about society as a whole—is to accumulate information capital. And information capital is one of the resources that plays a formative role in the formation and consolidation of the modern state (Bourdieu 1994). This type

of resources is authoritative—"the means of dominion over the activities of human beings themselves"—as opposed to allocative, material resources (Giddens 1985:7). In this sense, statistical information is an authoritative resource.

What is the purpose of the state's gathering of statistical information? Statistical information as a type of authoritative resources is one of the fundamental components that constitute the state's administrative power. And the first step to exercise administrative power is to keep society under surveillance. As Giddens (1985:13-15) notes, in one of its administrative activities, the state maintain a concentration of resources through surveillance, a process of "the accumulation of 'coded information'" or "information storage." More precisely, by surveillance, Giddens (1982:169) refers to "the accumulation of information" and "the supervision of the activities of subordinates by their superiors within any collectivity". The degree to which society is under state surveillance and supervision depends on how much administrative power the state can exercise. With the assistance of official statistical information the state can efficiently and effectively administer societal activities that take place within its territory. For example, by collecting population statistics, the state is capable of managing its finance and maintaining it internal order (Giddens 1985:179–80). This perspective leads to a conception that the collection of official statistics is best seen as one of the technologies that help the state keep society under surveillance and supervision. In short, it is a technology of state building.

Given the above conceptual framework, it is worthwhile discussing the extent to which keeping official statistics is able to facilitate state intervention. First, the statistical technology of state building is able to help impose symbolic violence—"the violence which is exercised upon a social agent with his or her complicity" (Bourdieu and Wacquant 1992:167). But why would state building resort to this type of violence? The answer lies at the nature of state building:

Making a nation-state entails creating "a relatively protected position in time and space" and a "homogeneity (and homogenization) of the subject population" (Tilly 1975:40). In other words, in addition to administering society, to build a nation-state is to build a "society," which has boundaries within which the population is to some degree homogenized (Anderson 1983). More important, to creating a bounded, homogenized society, the state needs to acquire symbolic power. Symbolic power is a power of "world-making" (Bourdieu 1989a:22) and operates through the mechanisms of "misrecognition" (Bourdieu 1989a, 1993). It is a power that makes social actors believe in certain kinds of ideologies, discourses, or knowledge.

Second, the ultimate goal of the state's gathering official statistics as a technology of state building is to control its population. In addition to classifying its subjects, the state seeks to penetrate society. For the state, to intervene in its society means to have oversight of the population, which means a "movement that brings about the emergence of population as a datum, as a field of intervention and as an objective of governmental techniques" (Foucault 1991:102). Thus the realization of the penetration of society—the creation of the situation of "state-in-society" (Migdal 2001)—depends on the functioning of biopower (Burchell, Gordon, and Miller 1991; Foucault 2009, 2010). Biopower is a power "for achieving the subjugations of bodies and the control of populations" (Foucault 1978:140). In this regard, official statistics play an auxiliary role in the deployment of biopower. For example, prisons, hospitals, and schools are the most common fields where disciplines of bodies are implemented (Foucault 2009). But bipower will not be effective if official statistics on crime, health, and education are not kept to monitor and evaluate the results of those practices of discipline. It is because of official statistics that the state can subordinate society to its authority by means of discipline and punishment.

To sum up, I argue that to get its "left hand," "right hand," and "many other hands" on

society (Bourdieu 1998; Morgan and Orloff 2017), the state needs to open its "eyes:" keeping official statistics is one of the technologies enabling the state to gather informational resources in order to keep a watchful eye on society. By collecting statistics on its population, the state attempts to keep society under surveillance and supervision with an ultimate goal of intervention in social fields. On the basis of this conceptualization, this article will draw on historical examples to make detailed arguments about the relationship between official statistics and state building.

NATIONAL STATISTICAL SYSTEMS (NSSes)[6]

A National Statistical System (NSS) is a country's government agency that is in charge of the collection, production, circulation, and analysis of statistical data on a population and society of a country. According to the United Nations Statistics Division, 187 out of 196 countries of the world have an NSS, nearly every country.

It should be noted that different countries' statistical systems have different names. For examples, Nigeria's NSS is called National Bureau of Statistics; Kyrgyzstan's NSS is called National Statistical Committee of Kyrgyz Republic; and Portugal's NSS is called Instituto Nacional de Estatística. A country's NSS may have changed its name. For instance, Indonesia's NSS, Badan Pusat Statistik (BPS-Statistics Indonesia), was called Centraal Kantoor voor de Statistiek in the colonial era, Shomubu Chosasitsu Gunseikanbu under the Japanese rule, Kantor Penyelidikan Perangkaan Umum Republik Indonesia (KAPPURI) in the early years after independence, and Biro Pusat Statistik between 1957 and 1997. In addition, NSSes have different organizational structures. For instance, the Unites States' NSS is a decentralized system

[6] This section is primarily based on the United Nations Statistics Division's website (https://unstats.un.org/home/), unless noted otherwise.

composed of more than 100 different governmental agencies, such as the Bureau of the Census, Bureau of Labor Statistics, National Center for Education Statistics, Bureau of Justice Statistics, and so on. By contrast, a large number of countries have centralized NSSes. For example, Canada's Statistics Canada and Australia's Australian Bureau of Statistics are centralized NSSes. In spite of these differences, each country's NSS has a common mission: collecting, maintaining, and analyzing official statistics. I list brief profiles of three NSSes in the following:

The Federal Statistical System (FSS) [United States of America]:[7] The FSS of the U.S. comprises 128 government agencies or organizational units of the Executive Branch in charge of "the collection, compilation, processing, or analysis of information for statistical purposes." 13 of these 128 agencies are principal one that "have statistical work as their principal mission." These 13 principal agencies are: Bureau of Economic Analysis; Bureau of Justice Statistics; Bureau of Labor Statistics; Bureau of Transportation Statistics; Census Bureau; Economic Research Service; Energy Information Administration; National Agricultural Statistics Service; National Center for Education Statistics; National Center for Health Statistics; National Center for Science and Engineering Statistics (of the National Science Foundation); Office of Research, Evaluation and Statistics (of the Social Security Administration); Statistics of Income (of the Internal Revenue Service). Overall, the mission of the FSS is to engage "in a wide variety of evidence-building functions," including "the collection, compilation, processing, analysis, and dissemination of data to create general purpose, policy- and program-specific, and research oriented statistics and datasets" as well as "program evaluation, performance measurement, and public health surveillance," aiming at providing "relevant, accurate, and objective information upon which government and private decisions are made."

The National Bureau of Statistics (NBS) [People's Republic of China]: China's NBS is a

[7] https://obamawhitehouse.archives.gov/omb/inforeg_statpolicy

"centralized and unified statistical system" and consist of "the government statistical system and department statistical system." The NBS is guided by a "unified leadership and decentralized administration" with several major responsibilities. For example, it claims "to work out laws and regulations on statistical work, to formulate directive rules for statistical operation, to draw up plans for statistical modernization and nationwide statistical surveys, to organize, exercise leadership and supervision over statistical and economic accounting work in various localities and departments, and to supervise and inspect the enforcement of statistical laws and regulations;" "set up and improve the national economic accounting system;" "to organize the implementation of major censuses of basic items related to the state and strength of the country;" "to act as the exclusive agency in verifying, approving, administering, and publishing basic national statistical data and to regularly disseminate to the general public statistical information with regard to national economic and social development;" "to build up an administer the national statistical information system and the national statistical database system; to formulate basic standards and operational rules for statistical database networks in various localities and departments;" and so on. Finally, The NBS "do not only collect and provide statistical data for governments at higher levels, but also collect and provide statistical information and submit statistical analysis reports for the local government."

Statistics South Africa (SSA) [South Africa]: the SSA has 5 departments: Economic Statistics, Population and Social Statistics, Quality and Integration, Statistical Support and Informatics, and Corporate Services. It mainly produces "timely, accurate and accessible official statistics to help advance economic growth, development and democracy in the new South Africa." Its duties include "providing the data, information and analysis required for implementing and monitoring the country's growth and development strategy;" "producing

authoritative statistical results on the basis of appropriate procedures that are sensitive to the diversity among our citizens;" "becoming an organization that increasingly matches the population with regard to population group, gender and physical disability;" "meeting the statistical needs of our stakeholders in national, provincial and local government, labor and management, parastatals and research institutions, civil society and special interest groups;" and so on. In sum, the SSA collects, publishes, compiles, and provides official statistics on the population, economy, and human activities of South Africa.

NSS ESTABLISHMENT AND STATE BUILDING

Within the conceptual framework developed earlier, the establishment of an NSS can be understood as a state's attempt to institutionalize the statistical technology of state building. This conceptualization is specified as follows: To regularly and routinely keep official statistics, the government of a nation-state usually needs to institute a governmental agency, such as a census bureau or statistical office. Once a governmental agency of statistics is established, the state government becomes capable of constantly and regularly keeping statistics on its society and population. Given that an institutionalized social activity is a structural pattern that is routinely practiced and regularly reproduced over time without intentional mobilization or external intervention (Clemens and Cook 1999).Thus, a government's routine and regular collation of official statistics can be perceived as the formalization, routinization, and institutionalization of the statistical technology of state building. On the basis of it, the establishment of an NSS in a country serves as an ideal indicator for the institutionalization of keeping official statistics.

NSSes and Democratic State Building

"The overall purpose of official statistics is to serve the information system of democracies."

— United Nations Fundamental Principles of Official Statistics

Statistics has been always indispensable to democratic politics. Not only is counting ballots the fundamental principle of the democratic rule, but statistics about the political views of constituencies are also pervasive, particularly in election seasons. Tilly (1983) states that, in twentieth-century democracies, statistical technologies have completely replaced other traditional approaches of political authorities to gauging the public mood. Through conducting surveys or polls and holding elections, a government can keep statistics on almost all the information that matters to the operation of politics. Additionally, in the eighteenth and nineteenth centuries, the emergence and development of statistical science and techniques were intertwined with democratic politics (Desrosières 2002a; Tilly 1983). For example, in eighteenth-century Britain, political arithmeticians started to use mathematical methods to keep written records of the state's economy; entering the nineteenth century, government officials started to systematically gather statistics on births, marriages, burials, and baptisms (Cohen 1983; Cullen 1975; Desrosières 2002a; MacKenzie 1981; Porter 1988). Similar methods were also applied in the political arena with the goal of building democratic institutions. For instance, in nineteenth-century America, statistical techniques were primarily utilized in apportionment, counting slaves and immigrants, and straw polls (Anderson 1990b; Eckler 1972). Most importantly, the U.S. Constitution requires the government to conduct a census every ten years to make policies pertaining to taxation and apportionment (Starr 1987:18). The Constitution states (in Article I, Section 2):

> Representatives and direct Taxes shall be apportioned among the several States which may be included within this Union, according to their respective Numbers, which shall be determined by adding to the whole Number of free Persons, including those bound to Service for a Term of Years, and excluding Indians not taxed, three fifths of all other Persons.

Although there were efforts to modify the principle specified in Section 2, such as the Fourteenth Amendment and Nineteenth Amendment, the use census statistics as the American state's instrument of the apportionment of political representation has not been changed. Census information is useful for a democratic government because it is collected on a statistical basis. Otherwise, it is of no utility for the distribution of representation. Keeping official statistics on populations, thus, lies at the core of democratic states' governance. Without the technology of gathering statistical data, democracy hardly can operate.

Elections are held regularly in democratic countries, so official statistics are and should be kept regularly. It is this characteristic of the regularity of statistical data collection that prompts democratic state makers to routinize and institutionalize the technology of keeping governmental statistics. For example, because the U.S. Constitution requires decennial censuses, government officials, legislators, and professionals had repeatedly called for a permanent census office until the Census Bureau was established in 1902 (Anderson 1990b; Eckler 1972). Therefore, it is anticipated that democratization precipitates the establishment of an NSS.

There is another reason why democratic state building is expected to create a need for keeping official statistics. In democracies, policies are made by legislators according to public opinion. In light of this logic, "statistical information [is] needed to help public officials

determine what legislation government should enact" (Kelman 1987:280). For example, James Madison, an American Founding Father, said in the 1790 congressional debates:

> [Congress] had now an opportunity of obtaining the most useful information for those who should hereafter be called upon to legislate for their country, if [the census] was extended so as to embrace some other objects besides the care enumeration of the inhabitants. … In order to know the various interests of the United States, it was necessary that the description of the several classes into which the community is divided should be accurately known. (Kelman 1987:280–81)

For the purpose of legislation, Madison suggested expanding the census that followed. Even though censuses had not been expanded until 1840, the text above reflects that, in general, lawmakers would demand as much statistical information as possible to propose and enact legislation. For example, Prasad (2012) finds that the neoliberal policy agenda (e.g., tax cuts) outlined by Ronald Reagan was essentially based on the opinion polls conducted by his in-house pollsters. Policymaking in democratic politics, thus, to a significant degree, results in the creation of a need for keeping official statistics.

The need for collecting statistics for policymaking can even promote the establishment of an NSS. A case in point is the United Kingdom's General Register Office (GRO). The GRO was founded in 1837 as the result of the enactment of the Births and Deaths Registration Act 1836. The main duty of the GRO is to keep vital statistics, such as births, marriages, and deaths in England and Wales. And this government agency was designed as adjunct to the New Poor Law, which was passed in 1834 to change the policy framework for poor relief. In this policymaking

episode, one of the key figures is Edwin Chadwick, Secretary to the Poor Law Commission. Chadwick's view of the problem of poverty was that poor sanitary conditions make people sick, and sickness causes pauperism. In addition to supporting the friendly society movement, which called on the government to gather "all the data desirable to be deduced from the past experience of the casualties of sickness and mortality," Chadwick, before the passage of the Registration Act, suggested it to include the collection of information about the causes of disease and deaths (Higgs 1996). After its establishment, the GRO also served as a provider of statistical data for medical research and public health legislation (Schweber 2006). In general, in the case of the UK, the requirement of statistical information on the population for policymaking brought about the creation of the GRO.

A third dimension of the relationship between NSSes and democratic state building is rationalized governance. Rational, bureaucratic systems of democracy prefer to accept the "neutrality" that statistical numbers represent. Rational, democratic governments are also relatively more willing to publicize the statistical data they gathered (Starr 1987:19). This does not mean that non-democratic states do not need to collect information. Instead, establishing an NSS signals that the government is openly engaged in the effort of collecting and publishing statistics on the public and citizens have access to them. This has been perceived as one of the foundations of democratic politics (Dahl 1989). Moreover, rationalized governance pursues not only accuracy, efficiency, and efficacy (Drori, Jang, and Meyer 2006a) but also the formalization of organizations (Meyer and Rowan 1977a). In this sense, establishing an NSS—a bureaucratic, rationalized government agency—is part of a democratic state's efforts to rationalize and bureaucratize its political system.

In sum, founding an NSS to routinely keep official statistics as a government technology

plays a necessary role in democratic state building. Statistical information about the population is mainly obtained for the purposes of allocating representation and facilitating policymaking. The cases of the USA's mandated census taking and the UK's GRO are examples illustrating the relationship between the NSS and democracy. On the basis of it, for the cross-national longitudinal analyses that follow, it is expected that democratization encourages the routinization of official statistics gathering.

NSSes and Capitalist State Building

The formation of modern states is accompanied by the transformative development of industrial capitalism. Gellner (1983) argues that the rise of nationalism and nation-states was a result of the socio-economic transformation from agricultural to industrial society. Industrial development gave rise to the growth of labor force and mass education, which to a significant degree homogenize people who lived in the same community. Moreover, Anderson (Anderson 1983) argues that print capitalism laid the foundation for the imagination of a homogeneous community, which is elementary to the emergence of a nation-state.[8] Research on state building also highlights the role of industrialization in the history of Western political development (Hooks 1990; Skocpol 1979; Tilly 1975, 1992). Capitalist development brings about the accumulation of economic capital, which is a driving force and even the only purpose of, as research on states in the Marxist tradition suggests, state making (Miliband 1969; Poulantzas 1969).

If state building to a large degree is affected by capitalist development, what role does the state action of gathering official statistics play in the sate-capitalism relationship? An indirect but straightforward interpretation is that capitalist development provides the state with resources to carry out official statistics gathering. The collection, analysis, and dissemination of official

[8] But Wimmer and Feinstein's (2010) study of the rise of nation-states finds no evidence for this perspective.

statistics also require vast resources. For example, the total budget allocated to the United States' Federal Statistical System was 6.63 billion dollars in the year of 2015.[9] Scientific and technological development demands resources (Fransman 1986a, 1986b). Much research has indicated that in "less developed countries" (LDCs), the development of science and technology usually takes a different path from that of Western "advanced" countries (Drori 1993; Moravcsik 1976; Shrum and Shenhav 1995). For state builders, in practice, the availability of resources plays a decisive role in acquiring the ability to collect official statistics. From the perspective of national, capitalist development, more developed countries are more capable of developing new political instruments of statecraft that are needed for the exercise of state power. New tools of government that help the state encroach on society are mostly based on costly sciences and technology (e.g., biometrics) (Foucault 2003). More developed countries own more resources, which can be devoted to the development of new sciences and techniques. For example, Schofer (2003) finds that the institutionalization of science is positively associated with industrial development. In this regard, it is anticipated that the establishment of NSS, which is the product of the formalization and institutionalization of statistical technologies, is more likely to happen in more developed countries.

Furthermore, there exists a deeper connection between official statistics and capitalist state building: the state's surveillance of industrial production and capitalist development. First of all, classical theorists have suggested that numerical calculation is inherently critical to capitalism (Schumpeter 1950; Sombart 1967; Weber 1956).[10] This argument points to the importance of techniques of systematic accounting to the operation of the capitalist economy. For example,

[9] https://obamawhitehouse.archives.gov/sites/default/files/omb/assets/information_and_regulatory_affairs/statistical-programs-2017.pdf

[10] For detailed discussion about and review of this argument, see Carruthers and Espeland (1991), Cohn (1983), Starr (1987:20–23), and Yamey (1949).

double-entry bookkeeping is utilized to keep track of business activities. Also, one of the distinguishing features of industrial capitalism is the centralized work-place, where labor power and production can be managed and kept under control. This type surveillance in the work-place requires the capacity to gather and store information and thereby systematic accounting and filing are of considerable importance to industrial capitalism (Giddens 1985:144–45). All in all, the techniques of accounting, quantifying, and analyzing economic activities lie at the core of the spirit of industrial capitalism (Desrosières 2002a; Starr 1987:24).

While bookkeeping was not implemented for political purposes, one of its variants—national accounting—is created to measure a nation's economic activities, serving as one of the major tools of economic statecraft (Perlman 1987). In general, to have oversight of its capitalist economy, the state tends to keep capitalist activities under surveillance, including production, consumption, work-places, workers, and markets (Evans 2012; Giddens 1985; Weiss and Hobson 1995). One of the tools which states have been employed since the eighteenth century is the statistical technology because it serves as an efficient means of gathering information about capitalist development.

In addition to the surveillance of economic development, the modern state always tends to intervene in capitalist markets. The construction and operation of markets involves a variety of political components, as Fligstein (1996:660) points out that how market building is essential for state building:

> The organizations, groups, and institutions that comprise the state in modern capitalist society claim to make and enforce the rules governing economic interaction in a given geographic area. Capitalist firms could not operate without collective sets of rules governing

> interaction. While most modern discussions of state-building have focused on welfare and warfare, modern capitalist states have been constructed in interaction with the development of their economies, and the governance of economies is part of the core of state-building.

More specifically, the state usually intervenes in capitalist market through policymaking. For instance, the American "hidden welfare state" made a policy that could change the real estate market, resulting in that more people would like to buy rather than rent houses and then more businesses tended to enter the market (Howard 1999). State policy also shapes market competition. For example, Dobbin and Dowd (1997) compare industrial policies in different periods, finding that three policy regimes, public capitalization, pro-cartel, and antitrust, determined the railroad markets in Massachusetts from 19th century to early 20th century. In general, the state's intervention in market affairs has been a solid pattern.

How do official statistics facilitate the state's intervention in markets? First, the gathering of official statistics serves as an instrument for the state's intervention in labor markets. For instance, for the U.S., the second half of the nineteenth century was a period of rapid industrialization and urbanization. In New England, these capitalist transformations were perceived by labor movement activists as causing a number of social and labor problems, such as child labor, unhealthy working conditions, unemployment, and pauperism. Although labor reformers mostly agreed on this diagnose, they could not reach an agreement about the cure. Some advocated for shorter hours, some preferred compulsory education for children, and others offered a free market solution. As a result, Massachusetts legislators organized a special commission to investigate the causes that led to the problems identified by reformers and later establish the Bureau of Labor Statistics of Massachusetts in 1869. Carroll Wright, a social scientists as well as

statistician, was appointed the head of the Bureau in1973. Wright's investigations into labor and social problems and collection of labor statistics became a successful model that many other states emulated (Leiby 1960). In 1984, Congress authorized the national Bureau of Labor Statistics (BLS) to be established, which was intended for collecting "information upon the subject of labor, its relation to capital, the hours of labor and the earnings of laboring men and women, and the means of promoting their material, social, intellectual and moral prosperity." (Goldberg 1985:4). And Wright, who was seen by legislators as neither a politician nor a labor man but an "excellent statistician" was appointed the first Commissioner of the BLS in 1885. The case of the establishment of the US BLS demonstrates that official statistics can be collected by the state in order to deal with matters in relation to labor markets.

Second, collecting official statistics is also a political tool for the state's intervention in product markets. The establishment of Census Bureau of the United States illustrates this perspective: Though decennial censuses had been taken by the American state since 1790, there had been no permanent government agency in charge of census taking until 1902 when the U.S. Census Bureau was finally authorized by Congress to be founded. Before the passage of this bill, there was no shortage of lobbying efforts to establish a permanent census office, which involved a number of groups of prominent scholars, reformers, and politicians. While these efforts failed due to a variety of reasons, apportionment as the fundamental function of census taking always made the issue of founding a permanent census office extremely complicated on the Hill. However, the key factor convincing Congress to ultimately found the Census Bureau is a surprising one: The cotton market. Cotton was a primary export items for the nineteenth-century U.S., but its price had been decreasing after the Civil War. Southern farmers suffered and representatives wondered what caused the problem. One of the causes was the possible, intended

overestimation of the cotton crop size by English textile companies, who were primary buyers of American cotton. Therefore, keeping good statistics on cotton production emerged as a necessary step for solving the problem. To estimate the size of cotton crop, Simon North, who was in charge the manufacture census, started the gathering of statistics on cotton gins in the 1900 census. He hired a former South Carolina congressman, Daniel Roper, to supervise this task. Consequently, this collection of official statistics on cotton was so successful that Congress finally passed the bill to establish a permanent census office. More importantly, the routine gathering of cotton statistics was mandated in that bill (Anderson 1990a:83–115). It can be concluded that it is legislators' concern with issues regarding the cotton market that finally brought about the establishment of a permanent U.S. Census Bureau. This case attests to the great extent to which product markets figure prominently in the state's action of keeping official statistics.

Taken together, the examples of the founding of the U.S. Bureau of Labor Statistics in 1885 and the U.S. Census Bureau in 1902 show how NSS establishment matters to capitalist state building. To summarize, capitalist development not only provides the state with the material ability to implement its usually costly state project of keeping official statistics, but also creates a need for the state's overseeing and mediating markets by gathering statistics about them. It is thus anticipated that capitalism will generally prompt state governments to be more likely to routinize the statistical technology of state building.

NSSes and War Making

Research on war has indicated the co-dependence of war and state building (Tilly 1985; Wimmer and Min 2006). For instance, Tilly (1985:186) argues, by making war—"[e]liminating or

neutralizing their own rivals outside the territories in which they have clear and continuous priority as wielders of force"—the state can consolidate its political authority and further eliminate internal rivals. War making is also tied to resource extraction, which is central to state building.

But how is fighting wars related to collecting official statistics? War, I argue, prompts states to gather statistics that are able to facilitate preparation for war, war mobilization, and war efforts. In other words, for states, fighting in wars requires efforts of statistical information gathering. Statistics on both human and material resources are critical and valuable for states to engage in warfare. For example, Anderson (1990b:63) finds that, before and during the American Civil War, census statistics were instrumentally utilized to evaluate "the military strength of the North and the South and assess direct taxes to finance the war." Reports of the decennial census of 1960 were provided for the Lincoln administration. Furthermore, Congress in 1962 authorized then Census Director Joseph Kennedy to submit census data directly to the War Department. The Census Office also offered its staff to the War Department to produce and analyze statistical information. Those "war statistics" provided for the government included numerical information about not only the population but also materials that were valuable for fighting the Civil War. One of the most useful statistical instruments was the "statistical map," which largely empowered Northern commanders by providing statistics on "the amount of improved land, the number of horses and mules, and the amount of wheat, corn, oats, and other crops produced" at the county level. This type of statistical information was thought of as useful for fighting a war, so that General William Tecumseh Sherman, known for his campaign of the March to the Sea, acknowledged: "No military expedition was ever based on sounder or surer data" (Anderson 1990b:64). Overall, the Census Bureau and the official statistics it produced played a critical role

for the Union's battle with the Confederation.

In addition to the Civil War, official statistics are also collected for the purpose of assisting the American state to fight external wars. During World War I, the Census Bureau provided the government with statistical information on the population, especially on draft-age men. Moreover, just as during the Civil War, the Census Bureau offered statistics on materials for fighting WWI, such as coal, iron, graphite, leather, steel, and wool. Most importantly, in 1918, then President Woodrow Wilson recruited Edwin Gay, Dean of the Harvard Business School, to create a new government agency—the Division of Planning and Statistics, which was under the U.S. Shipping Board and War Trade Board. This Division was later re-organized as the Central Bureau of Planning and Statistics (CBPS), and Gay was appointed as its director (Anderson 1990b:128). Although the CBPS was not created to produce statistics, it administered and coordinated statistical data pertaining to war work collected by other government agencies, aiming to facilitate the state to fight WWI (Heaton 1968). Also, statistical information for war efforts and war mobilization on the home front was integrated with other war intelligence and employed by the American state to form military strategies with the goal of winning the World War. Thus, the establishment of the CBPS was a significant part of the American state's WWI effort.

Taken together, the above two historical cases from the U.S. attest to the argument that official statistics are of paramount importance for states engaging in warfare. It is expected that war prompts states to engage in the collection of statistics about their societies. Outbreaks of wars and the experiences of engaging in warfare should propel a state to institute an NSS to keep official statistics.

NSSes and Colonial and Post-colonial State Building

More recently, issues of colonial or post-colonial state building have received considerable attention in sociology (Go 2004, 2008; Morgan and Orloff 2017; Steinmetz 2007, 2008). Just like the relationship between state formation and the rise of capitalism, the history of Western colonial expansion is inextricably connected to the globalization of capitalism (Wallerstein 2004). Against this backdrop, one of the chief aims of colonial state building is resource extraction, which, as discussed earlier, requires the technology of statistical information gathering since there is always a need for colonial power holders to monitor the economic and capitalist activity going on in their colonies. For example, the British Colonial Office, founded in 1854 to deal with colonial affairs, owned a Statistics Department, and its statisticians were responsible for working with official economists to look after statistics on "economic progress" of colonies (Jeffries 1956). Moreover, information extraction is crucial for colonial government as well. Research on the history of science has pointed out "Western" science and techniques such as cartography, ethnography, and statistics were employed by missionaries, travelers, imperialists, and colonial scientists in collecting information about the colonized (Hansen 2015; Penny and Bunzl 2003; Stagl 1995). Generally, keeping the colony under control always serves as a top priority of colonial state building. For the colonist, collecting official statistics is undoubtedly a useful tool of colonial statecraft.

The power of colonial official statistics lies at the method of "systematic *quantification*" (Anderson 1983:168, original emphasis). Statistical quantification enables the colonial ruler to totalize the diverse colonized as a whole. Echoing Bourdieu's (2015) argument that totalization plays a fundamental role in state building, Appadurai (1993:317) makes a forceful argument relating official statistics to colonial state building:

> Thus, though early colonial policies of quantification were utilitarian in design, I would suggest that numbers gradually became more importantly part of the illusion of bureaucratic control and a key to a colonial imaginaire in which countable abstractions, both of people and of resources, at every imaginable level and for every conceivable purpose, created the sense of a controllable indigenous reality. Numbers were part of the recent historical experience of literacy for the colonial elite, who had thus come to believe that quantification was socially useful. There is ample evidence that the significance of these numbers was often either nonexistent or self-fulfilling, rather than principally referential with regard to a complex reality external to the activities of the colonial state. In the long run, these enumerative strategies helped to ignite communitarian and nationalist identities that in fact undermined colonial rule. One must therefore ask how the idea of number as an instrument of colonial control might have entered the imagination of the state?

In 1910, the Census Office of the Union of South Africa was established. A year after, the first census was carried out, which was initially designed to be synchronized with the Census of the British Empire 1911 (Christopher 2011). However, prior to 1911, the British Empire had regularly collected population statistics, among other colonies, in certain areas of South Africa since 1865. The government in the metropole even considered founding a "British Empire Statistical Bureau" to coordinate and manage its colonial statistics (Beaud and Prévost 2005). Great Britain's gathering of colonial statistics was systematic and constant. Starting from 1911 onwards, the Census Office of South Africa had taken fourteenth censuses before the end of Apartheid (Khalfani and Zuberi 2001). However, these official statistics on the population of

South Africa present an over-simplified image of the South African society, which was created and imposed by the British colonizer with the goal of making the colonized "legible." For instance, in the census of 1911, the population was divided into only three races: "Bantu," "Mixed and other coloured," and "European/White." According to the then director of the Census Office, John Bruce Moffat, in these census statistics, "many individuals have been wrongly described" and "distinction between members of different tribes is becoming difficult, if not possible, in many districts" (Khalfani and Zuberi 2001:165).

The colonial ruler's arbitrary and confusing way of racial classification was applied not only in South Africa but also in other colonies of the British Empire. For example, since the Indian uprising of 1857-1858,the British colonial regime had taken eight censuses before the Indian people formed an independent nation-state in 1947 (Cohn 1996). In these colonial statistics, the term "Caste" was the major category used to classify the Indian population. However, the definition and use of "Caste" were not consistent in the census statistics collected by colonial officials. For example, in the 1872 census, the category of "Caste" was mainly used to classify "Hindus" and other ethnic groups, such as "Muslims," "Syed," "Sheikh," "Pathan," and "Moghul" were under the category of "Class." But in the 1901 census, "Caste" was used to classify "Hindus" and "Jains," and other ethnic groups were counted as "Tribes" or "Race of Others" (Bhagat 2006). This classificatory inconsistency was also present in Malaysia. Anderson (1983:165–66) thoroughly analyzes:

> Take, for example, the 1911 Federated Malay States Census, which lists under "Malay Population by Race" the following: "Malay," "Javanese," "Sakai," "Banjarese," "Boyanese,""Mendeling" (sic), "Krinchi" (sic), "Jambi," "Achinese," "Bugis," and "Other."

> Of these "groups" all but (most) "Malay" and "Sakai" originated from the islands of Sumatra, Java, Southern Borneo, and the Celebes, all parts of the huge neighboring colony of the Netherlands East Indies. But these extra-FMS origins receive no recognition from the census-makers who, in constructing their "Malays," keep their eyes modestly lowered to their own colonial borders. (Needless to say, across the waters, Dutch census-makers were constructing a different imagining of "Malays," as a minor ethnicity alongside, not above, "Achinese," "Javanese," and the like.) "Jambi" and "Krinchi" refer to places, rather than to anything remotely identifiable as ethnolinguistic. It is extremely unlikely that, in 1911, more than a tiny fraction of those categorized and subcategorized would have recognized themselves under such labels. These "identities," imagined by the (confusedly) classifying mind of the colonial state, still awaited a reification which imperial administrative penetration would soon make possible. One notices, in addition, the census-makers" passion for completeness and un-ambiguity. Hence their intolerance of multiple, politically "trans-vestite," blurred, or changing identifications. Hence the weird subcategory, under each racial group, of "Others"- who, nonetheless, are absolutely not to be confused with other "Others." The fiction of the census is that everyone is in it, and that everyone has one - and only one - extremely clear place. No fractions.

Official statistics collected by British colonizers embody the British Empire's top-down view of its colonial subjects. Those census categories were created to facilitate colonial dominion over the colonized peoples. Racial/ethnic statistics hardly make sense to the surveyed but are beneficiary to the surveyor, whose goal is to keep the surveyed under surveillance. This type of statistical surveillance, like typical state surveillance through official statistics, also has impacts

on the surveyed (Bourdieu 2015; Hacking 1997). For example, after decolonized, the India government considered the continual use of "caste" in their censuses (Bhagat 2006). To the extent that colonial censuses serve as cultural vehicle for the colonizer's worldview, the gathering of colonial statistics is best seen as a political instrument of colonial state building.

However, does the collection of official statistics become a colonial legacy for post-colonial state builders? Historians of science and technology have investigated how Western sciences and technologies diffused to non-Western regions, and much research has argued that colonization serves as proxy for the diffusion, adoption, and learning of colonial, scientific-technological statecraft (Basalla 1967; McClellan III 2010; Pyenson and Sheets-Pyenson 1999). For instance, Schofer (2003) indicates that, compared to other countries, former colonies were quicker to institutionalize modern science. In addition, because the majority of countries that achieved independence in the twentieth century—especially after 1945—were colonies of Western empires (Strang 1990, 1991), colonization, de-colonization, post-colonialism, and state formation are perceived as interrelated historical processes. Colonial nationalism, which usually emerged among colonized local elites in the colonial era, has had profound effects on post-colonial nation building (Anderson 1983). Anti-colonial nationalists learned and acquired instruments of governance from colonizers, particularly in the post-colonial political struggles (Chatterjee 1993; Fanon 2008). Therefore, it can be said that post-colonial state makers are able to learn and acquire statistical statecraft from their former colonizers.

In summary, keeping official statistics serves as one of the fundamental tools for the colonizer to subjugate its subject population. This statistical statecraft can become a colonial legacy for the post-colonial state builders. In the cross-national longitudinal analyses that follow, one can expect colonialism will be positively associated with NSS establishment.

NSSes and State Building in World Society

State building is a set of socio-political processes that not only take place within national boundaries but are also conditioned by international environments. According to studies of world society, nation-state as a universal form of modern government is constructed through global cultural processes, and a various institutions of state government are shaped by international, associational linkage (Meyer et al. 1997). World society as a global cultural field provides nation-states with symbolic resources, organizational principles, and normative guidance, resulting in institutional isomorphism in a range of political and societal domains. Examples include the global expansion of education (Meyer, Ramirez, and Soysal 1992), environmentalism (Frank, Hironaka, and Schofer 2000), the criminal regulation of sex (Frank, Camp, and Boutcher 2010), decolonization (Strang 1990), and sciences (Schofer 2003).

Among other important agents, international organizations play a formative role in those worldwide mimetic, coercive, and normative processes (Simmons, Dobbin, and Garrett 2008). Intergovernmental organizations (IGOs) and international nongovernmental organizations (INGOs) exert enormous influence on the practices of nation states. For example, in the nineteenth century, the International Statistical Congress (ISC) were a international field where state builders (mainly European) exchanged, learned, and were persuaded to consider ideas in relation to official statistics (Randeraad 2011). Starting from 1853 onward, European and the American governments sent official delegates to participate in the ISC, which was held in the major cities of European countries, including Brussels (1853), Paris (1855), Vienna (1857), London (1860), Berlin (1863), Florence (1867), The Hague (1869), St Petersburg (1872), and Budapest (1876). Moreover, this was the efforts made by European official statisticians to

"internationalize" the practice of collecting statistics and producing statistical knowledge. As F. T. Berg, chief of the Swedish Central Bureau of Statistics, wrote in a letter to the Italian statistician and organizer of the 6th ISC Pietro Maestri (Randeraad 2010:6):

> The statistical congresses will, in my opinion, never be truly international until they have been held in the capital cities of the most important states and, while moving around, retained a substantial national character. I believe their national disposition is a genuine advantage and should not elicit criticism. We must become acquainted with all national circumstance to give attempts at international generalizations a greater chance of success.

The success of the ISC then gave rise to the idea of establishing an international statistical association. In 1885, the International Statistical Instituted (ISI) founded, which has been the largest professional association of statistics in the world.

Formal organizational structures are themselves an innovation that can be adopted and mimicked through international governmental or organization networking (Drori, Meyer, and Hwang 2009). Research on the rationalization of government finds that state governments are more likely to adopt a rationalized structure of governing organizations in the presence of strong international organizational linkage (Drori, Jang, and Meyer 2006); census taking, as an important part of rationalized government, is also argued to be globalized by means of the expansion of the world polity (Ventresca 1995a). But does this type of argument apply to the case of NSS establishment? The establishment of NSSes involves both the learning of new technologies and the isomorphism of formal, bureaucratic organizations. Nation-states' engagement with the world community creates opportunities to learn, mimic, or be forced to

accept the practice of gathering official statistics. For instance, with the dramatic rise of the founding of IGOs and INGOs since the end of WWII, the UN's Statistical Commission was established in 1947 to be an IGO that promotes the gathering national statistics and the use of statistical methods. It also oversees the UN's Statistics Division, which offers the "Fundamental Principles of Official Statistics" to "ensure that national statistical systems in such countries would be able to produce appropriate and reliable data that adhered to certain professional and scientific standards."[11] This effort to provide nation-states with principles of and guidelines for collecting national statistics serves as the chief mission of the UN's Statistics Division, which is claimed to "compile and disseminate global statistical information, develop standards and norms for statistical activities, and support countries' efforts to strengthen their national statistical systems" and "facilitate the coordination of international statistical activities and support the functioning of the United Nations Statistical Commission as the apex entity of the global statistical system."[12] Most importantly, the UN's Statistical Commission plays a very critical role in assisting nation-state, especially from the global South, to establish, operate, and manage NSSes (Kiregyera 2015).

In sum, engagements in world society prompt state builders to formalize and institutionalize the practice of statistical statecraft—that is, to establish NSSes to keep official statistics. Whereas certain organizations, such as the ISI and the UN's Statistical Commission, serve as a key agent that provides states with resources to practice gathering official statistics, one can expect that, more generally, it is the international organizational embeddedness that facilitates the adoption, diffusion, and institutionalization of the statistical technology of state building. In other words, those intergovernmental, associational networks play the role of channeling the knowledge about

[11] https://unstats.un.org/unsd/dnss/gp/fundprinciples.aspx
[12] https://unstats.un.org/home/about/

and experience of establishing NSSes. In the cross-national, longitudinal analysis that follows, it is anticipated that the more intergovernmental connections will encourage the establishment of NSSes at the global level.

CROSS-NATIONAL LONGITUDINAL ANALYSIS

To test the theoretical arguments about the relationship between official statistics and state building, I analyze a cross-national longitudinal dataset that includes 157 countries from 1826 to 2010. This large-N analysis also complements the above discussion on the historical cases of NSS establishment that are mainly drawn from the U.S. and the U.K. More specifically, the unit of observation is "country-year" (e.g., Japan-1895) and all the time-varying explanatory variables are lagged one year. The analyses that follow examine the structural conditions leading to the establishment of NSSes all over the world. Each of those structural conditions is mapped onto, as well as treated as an indicator of, one of the theoretical arguments developed above. Thus the aim of the analyses is to explore how the timing of NSS establishment is influenced by those structural conditions of state building.

Outcome Measures

The outcome variable in the analyses is the timing of NSS estalishment. Information about the year in which a country's NSS was founded was primarily collected from the United Nations' (UN) website.[13] The UN's web pages offer detailed information on all the UN member NSSes, including their names, web page links, brief histories, legal foundations, and data collection. I coded the dependent measure by reading these web pages and searching the official websites of

[13] This website also offers links to the official websites of those NSSes. See https://unstats.un.org/unsd/dnss/cp/searchcp.aspx

all the NSSes. According to the website, 187 out of 193 UN member countries have an NSS. But twenty-two of them offer no information that can be coded for my research. In addition, the International Statistical Institute's (ISI) website also provides similar information about NSSes around the world (102 countries).[14] On the ISI's website, each entry has the name, physical address, email, and internet link of a statistical system, which serve as complimentary sources. Finally, after integrated with other existing datasets with information about the explanatory measures included in the analyses, my dataset contains the timing of NSS establishment of 157 countries. A full list of these countries and their NSSes is in the Appendix.

It should be noted again that the NSS is a general term for any national governmental branches of official statistics, including national statistical offices, census bureaus, departments of statistics, and so on. In addition, if a country has two or more similar institutions, then only the earliest is coded into the dataset. For example, the United Kingdom's General Register Office (GRO) was established in 1837 and Office for National Statistics (ONS) in 1996, both of which are events that represent the institutionalization of statistics as statecraft in British governance. Only the founding year of the GRO, 1837, was included in the database. The reason is that, because once an NSS is founded it is very likely to be moved, expanded, re-organized, or re-named, accounting for these changes alike is beyond the scope of this article. In this regard, in the dataset a country has only one NSS, which is the earliest established one since independence. If an NSS was founded prior to its country's independence, the year of NSS establishment is coded the year of independence. Lastly, figures 1, 2a, and 2b present a global, macro founding pattern of NSSes from 1826 to 2010. They show that, while NSSes started to exist in the nineteenth century, the majority of nation-states established NSSes in the twentieth century.

[14] https://www.isi-web.org/index.php/resources/national-statistical-offices

(Figures 1, 2a, and 2b about here)

Explanatory Measures

This article tests hypotheses about the structural factors that influence states' institutionalization of statistical technologies for state building. Therefore, all the independent variables are measures of the factors that are hypothesized to affect the dependent measure. Moreover, the independent variables included in the analyses below, unless otherwise noted, are all time-varying and measured on a yearly basis. Table 1 presents the descriptive statistics of all the independent measures.

(Table 1 about here)

Populations.— The population of a country, compiled from Correlates of Wars (COW) (Singer and Small 1994), is a time-varying variable updated on a yearly basis. It serves as a control variable.

Democratization.—To test the argument about the relationship between keeping official statistics and democratic state building, I include a measure of democracy from Polity IV (Marshall, Jaggers, and Gurr 2008). The variable is a scale from -10 to 10, representing a country's degree of institutionalized democracy in a particular year (from low to high). Missing values are interpolated to allow for a more complete analysis of the entire period.

Economic Development.—This is a second variable used to test the perspective of capitalist state building. It is measured by domestic product per capita (GDP), which is commonly used in cross-national analyses. Data on GDP are compiled from the Maddison Project (Bolt and Zanden 2014) and the World Bank.[15] Missing data are extrapolated by means of exponential smoothing.

War Onset.—This is a measure designed to test the argument about the relationship

[15] The World Bank's website: http://data.worldbank.org/

between keeping official statistics and war making. It is a time-varying, aggregate measure, which is the sum of the number of wars that have been fought in a country up until a year. This measure serves as an indicator of a country's experience of engaging in warfare. Data are compiled from COW War Data (Sarkees and Wayman 2010).

Colonialism.—To test the argument pertaining to colonial state building, I include an indicator of whether or not a country was colonized prior to independence. If a country was colonized before reaching independence, then the dummy variable of *Colonialism* is coded 1, and 0 otherwise. Data on colonization are obtained from the Issue Correlates of War (ICOW) Project (Hensel and Mitchell 2006).

IGO Ties.—I include a measure designed to test the argument about the influence of world society on NSS establishment at the country level. The linkage to world society is measured by the number of inter-governmental organization (IGO) memberships for a nation-state. Data on IGO membership come from the Correlates of War (COW) Project's Intergovernmental Organizations Data Set (Pevehouse, Nordstrom, and Warnke 2004).

Region.—Lastly, I include region dummies (Africa, Asia, Eastern Europe, Latin America, Middle East, and Oceania; the reference group is Western Europe and North America) to capture regional variations.

Estimation Methods

The rate of NSS establishment is estimated by the proportional hazard model. This modeling framework belongs to the event history method broadly defined (Strang and Tuma 1993). Within this framework, nation-states are seen as being "at risk" of establishing NSSes since independence. In other words, each nation-state has "hazard rates" of founding an NSS. The

hazard rate function, $\lambda(t)$, can be written as,

$$\lambda(t) = \lim_{dt \to 0} \frac{Pr(t \leq T < t + dt)}{dt \cdot S(t)}$$

where *t* is survival time and $S(t)$ is a survival rate function. The distribution of survival time leads to different types of event history models. One of the most common approaches is the Cox model (proportional hazard model), which assumes survival time to be exponentially distributed. More important, a Cox model allows the hazard rate to be an exponential function of an array of independent variables.

$$\lambda\big(t\big|X_i(t)\big) = \lambda_0(t) \cdot \exp(X_i(t) \cdot \beta),$$

where $\lambda_0(t)$ is the baseline hazard, and β is the vector of covariates. Because most of the covariates in my analyses are time-varying variables, $X_i(t)$ denotes the value of a vector of covariates for country *i* at time *t*. Years following the founding of an NSS in a country are excluded from the analyses because the country is no longer "at risk" of establishing an NSS. Furthermore, since the dataset is an unbalanced panel, it is reasonable to assume the observations are clustered at the country level. Instead of partial likelihood estimation which is usually used in Cox models, the specification of clustered observations requires other estimation techniques, such as Generalized Estimating Equations (GEE) or Generalized Mixed Effects Models (ME). For the analyses presented in this article, GEE serves as an appropriate estimation technique in that the purpose of my analyses is not to tease out some specific random (mixed) effects and GEE provides robust standard error estimates (also referred to as Huber–White standard error estimates) (Hardin and Hilbe 2012). To fit GEE proportional hazard models, I used statistical software R and its package, *survival*.

Results

(Table 2 about here)

Table 2 presents the results for GEE proportional hazard models of the rate of NSS establishment from 1826 to 2010. Model 1 in Table 2 is designed to test the democratic state building argument. As expected, it shows that democratization has significant effects on the rate of NSS establishment in the entire period, implying that collecting official statistics is critical for democratic politics. Model 2 of Table 2 examines the capitalist state building perspective by adding the measure *Economic Development*. As this model shows, there is a significant effect of a strong capitalist economy on NSS establishment, which supports the theoretical perspective that capitalist development promotes NSS establishment, indicating that states very much rely on official statistics to keep track of their capitalist economies.

Model 3 adds the variable of war onset to examine the argument about the effects of war making on NSS founding. The results shown in Model 3 indicate that countries that have fought in more wars are faster to establish an NSS. The more wars a state is involved in, the quicker its NSS is founded. Model 4 is designed to examine the colonial or post-colonial state building perspective concerning whether colonialism or colonial legacies has effects on NSS founding. It shows that former colonies establish an NSS at a more rapid rate. This finding signals that keeping official statistics serves as one of the tools for the colonizer to keep the colonized under surveillance and control. Finally, Model 5 adds a measure of *IGO Ties*, testing the world polity argument about the effects of world society on states' routine action of gathering official statistics. It demonstrates that international political embeddedness does accelerate the rate of NSS establishment.

Note that Model 5 of Table 2 is also a full model, which summarizes all the theoretical perspectives that are anticipated to have effects on the establishment of NSSes. First, the

coefficient of *democratization* is significantly positive, which means that countries at a higher democratic level are generally faster to establish formal statistical systems than those at a lower democratic level. Second, as expected, *economic development* is significantly and positively associated with the rate of NSS founding. Third, the effect of *war* on NSS establishment is in the significant, positive direction, which lends support to the war making perspective. Fourth, *colonialism* has a strong, significant effect on NSS establishment. Countries which were colonized before are about two times quicker (exp[0.727]=2.07) to establish an NSS than those which were never colonized. Fifth, *intergovernmental organizational ties* generally accelerate the rate of NSS establishment. Overall, the results of Model 5 as well as cross Table 2 resonate with all the theoretical arguments about the relationship between state building and official statistics.

Regional Variations

Models 1 to 5 in Table 2 also include regional dummies as controls, which are designed to differentiate the regional variations in the rate of NSS establishment. As the results show, in general, compared with Western Europe and North America, which serve as the reference group in all Models, NSSes are instituted at a higher rate in Africa, Asia, and Eastern Europe, but lower in Latin America, the Middle East, and Oceania. For example, Eastern European states are significantly about four times quicker in founding an NSS (exp[1.417]=4.12). Additionally, Model 5 shows that, while the coefficients for the Middle East and Oceania are negative, they are not significant; the coefficient for Africa is positive across all models but loses significance in Model 5. Therefore, generally speaking, African, Asian, and Eastern European states are quicker to establish NSSes. It should be noted, however, that instead of being proxies for specific theoretical perspectives region dummies serve as control variables. Their coefficients signal only

geographical variations rather than effects.

(Table 3 about here)

Temporal Variations

Table 3 demonstrates how the effects of all the variables vary in the nineteenth and twentieth centuries. For nineteenth-century state builders (Model 6 in Table 3), war making is the only structural force that pushes them to found NSSes.[16] In contrast, twentieth-century state makers are in general influenced by democratic politics, economic development, colonialism, and intergovernmental linkages (Model 7 in Table 3). This distinction is consistent with the histories of the development of statistical science and technology (Desrosières 2002a; Hacking 1990; Porter 1988). The early adopters, mostly Western countries, usually collected official statistics for very practical reasons. Fighting in wars is about the survival of states. Official statistics are useful information that can help states prepare for and survive wars. But in the twentieth century, more nation-states were founded through deconolization (Anderson 1983; Strang 1990). There were also waves of democratization (Huntington 1993), and the world was more connected (Meyer et al. 1997). These social, political, and cultural forces structured and influenced state actors in ways that were entirely different from the nineteenth century. Thus state makers were motivated, enabled, and limited by more than just practical concerns to establish NSSes.

DISCUSSION AND CONCLUSION

Cross-national longitudinal analyses across the world from 1826 to 2010 have indicated that democratization, capitalist development, war, colonialism, and intergovernmental ties all affect

[16] In my analyses, countries that have an NSS established in the nineteenth century are Netherlands, Austria, Belgium, France, the United Kingdom, Denmark, Spain, Russia, Sweden, Romania, Greece, Switzerland, Serbia, Bolivia, Finland, Hungary, Brazil, Germany, Norway, Bulgaria, the United States, Paraguay, Japan, and Argentina.

the rate of NSS establishment. In addition, these effects vary across the globe over time. For Western countries, it is mainly wars that prompt the establishment of their NSSes; for most former colonies, NSS establishment is to a large degree a colonial legacy; for the majority of nation-states emerging in the twentieth century, democracy, capitalism, and international embeddedness to varying degrees promote NSS establishment. General speaking, the results suggest that states' action of establishing NSSes to keep official statistics is deeply embedded in and inextricably connected to a variety of socio-political, structural conditions, including democratic state building, capitalist state building, war making, colonial and post-colonial state building, and the word polity.

For the entire period of 1826-2010, democratization generally accelerates the rate of founding NSSes. This means that democratic state builders are quicker to routinize, formalize, and institutionalize statistical technologies of statecraft. What accounts for this relationship? As discussed earlier, the operation of democratic politics heavily relies on statistical techniques and calculation to apportion representations and inform policymaking. In a democratic political environment, both social and political actors cannot effectively and efficiently communicate without gaining sufficient information on society. In this sense, information gathering plays a prominent role in democratic politics. To play the democratic game, politicians in general and government officials in particular need to have a good grasp of competitors, constituencies, and public opinion. Statistical technologies, therefore, serve as efficient tools for collecting the information they need in terms of policymaking (Herbst 1995; Prasad 2012) or running election campaigns (Kelman 1987; Starr 1987).

Why is the impact of democratization on the establishment of NSSes in the period of nineteenth century positive but not significant? The nineteenth century was an "era of statistical

enthusiasm" (Rosen 2015:147; Starr 1987:24)—the progress and evolution of statistical thinking and technologies, which initially meant "state-related science (*Statistik*)," was embedded in political developments in the nineteenth century (Desrosières 2002a; Hacking 1990; Porter 1988; Schweber 2006). Moreover, democracy was a relatively new political idea in nineteenth century Europe and North America, where politicians, administrators, and scientists just started to try to invent techniques for the implementation of the new political ideal. Additionally, countries that had relatively advanced statistical technologies, like France and Germany (Prussia), were monarchies. Democratic countries like the United States were very rare. Thus, the use of new statistical technologies for state building was not restricted to democratic state builders in the nineteenth century.

My analyses also suggest that capitalist development is a second salient structural condition under which state builders decide to institutionalize the technology of keeping official statistics. A first mechanism is that, for states, economic development serves as material origin of the possible advancement of new sciences and technologies, the political institutionalization of which simply requires vast resources. Therefore, wealthier countries more quickly apply statistical technologies to state building and government. In other words, a stronger national capitalist economy provides state builders with sufficient resources to develop, implement, experiment with, and practice statistical governmentality.

A second mechanism by which keeping official statistics count for capitalist state building is that a rising capitalist economy prompts the state to use statistical tools to keep track of both its product and labor markets. The procurement of statistical information about economic activities and market conditions is essential for states to levy taxes and make economic and social policies (Starr 1987). As mentioned earlier, the establishment of the U.S. Bureau of Labor Statistics (BLS)

illustrates how the American state managed to keep an eye on labor markets; the founding of the U.S. Census Bureau demonstrates the paramount importance of product (cotton) markets for the American government in making decisions about instituting a permanent government agency responsible for gathering population statistics. To summarize, keeping official statistics is not only a useful but also necessary instrument of capitalist state building.

The cross-national analyses also indicate that the association between war and NSS establishment is significantly positive for the entire period of analysis. However, this positive association diminishes and loses significance in the twentieth century. This means that for early adopters, which are mostly European countries, warfare is the most influential driving force that prompts state builders to establish a statistical system. As illustrated in the preceding discussion about the U.S. Census Office's collaboration with the Lincoln administration in fight the Civil War and the Wilson administration's establishment of the Central Bureau of Planning and Statistics (CBPS) in preparation for WWI, keeping official statistics is of considerable importance for the state's engagement in warfare.

The Results also reveal that colonialism significantly increased the rate of NSS establishment for the entire era of observation, suggesting that colonization is another important driving force that influences the rate of adopting statistics as statecraft. Historically, Western colonizers pioneered the development of statistical technologies to gather information on the colonized (Hansen 2015; Penny and Bunzl 2003; Stagl 1995). Colonized peoples were treated, categorized, and documented by colonial census takers as "objects"— as botanists would flowers or plants (Brockway 1979; Vicziany 1986). Although scholars of modernization have argued that Western explorers brought science and technologies to the colonized, imperialists also developed colonial science and technology mainly for extraction (Osborne 2005), and statistical statecraft

was deployed for the sake of colonial interests. Most importantly, collecting population statistics served as an instrument of colonial government, strengthening and consolidating not only administrative power but also disciplinary and symbolic power of colonial state builders (Anderson 1983; Appadurai 1993; Cohn 1996). The examples I discussed earlier of the British Empire's gathering of colonial statistics in South Africa, India, and Malaysia attest to this perspective on the co-production of official statistics and colonial state building.

The significant association between colonialism and the rate of NSS establishment over the entire period of the analyses, especially for non-Western nation-states, also suggests that post-colonial state builders acquired technologies that kept official statistics from their colonizers. In other words, the statistical statecraft of colonialism becomes a legacy for post-colonial state makers after decolonization. This mechanism of the diffusion of statistical statecraft is in parallel with the burgeoning of nation-states after WWI. The nation-state as the only legitimate form of government in the twenty-first century was spread out from the West to other parts of the world through colonization. More precisely, post-colonial nationalism is to a large extent an imitation of imperialists' official nationalism (Anderson 1983; Chatterjee 1993). Indeed, for most African countries, establishing NSSes was usually a crucial part of their state building projects at the initial stage (Kiregyera 2015). Yet it should be noted that there is no guarantee that the adoption of statistical statecraft would always be "successful." In fact, for many African countries, collecting official statistics is a challenging and daunting task (Kiregyera 2015), and their official numbers often lack authenticity and credibility (Jerven 2013).

In addition to colonialism, intergovernmental linkage also contributes to the global spread of statistical statecraft. My cross-national longitudinal analyses find a positive association between intergovernmental connections and the rate of NSS establishment, suggesting that the

cultures and politics of world society play a crucial role in explaining the institutionalization of keeping official statistics. This finding is generally consistent with arguments made by world polity scholars, who highlight the importance of worldwide cultures and interlinks among nation-states for various processes of diffusion and institutionalization (Drori, Meyer, and Hwang 2006; J. W. Meyer 2002; Schofer 2003; Schofer and Meyer 2005; Soysal and Strang 1989; Ventresca 1995a). As a result of worldwide cultural isomorphism, the routine collection of official numbers percolates through the world when the world becomes more connected and structured, where intergovernmental links serve as channels for the global diffusion of statistical statecraft. This finding is also in line with the picture portrayed in histories of statistical science and technologies, which point out that statistical thinking began to emerge in eighteenth- and nineteenth-century Europe (Daston 1988; Hacking 1990; MacKenzie 1981; Porter 1988). Specifically, because most early adopters are European states, intergovernmental activities provide late adopters with more opportunities to learn, acquire, and practice the application and deployment of statistical science and technology in government. The International Statistical Conference (ISC) in the nineteenth century and the United Nations' Statistics Division in the twentieth century are two intergovernmental organizations that exemplify this diffusion perspective.

Intergovernmental connections are also able to shape a global culture of rationalized governance. Entering the twentieth century, not only did democracy become a desirable form of government that many new emerging nation-states tended to emulate or imitate (Huntington 1993; Simmons et al. 2008), but the idea of rationalized governance—"orderly, impersonal, rule-based, and merit-based administration" (Drori, Jang, and Meyer 2006b:207)—also began gaining ground globally. Given that rationalization is meant to pursue calculability, predictability, and the

replacement of people with non-human techniques (Ritzer 2010), keeping official statistics has come to be commonly perceived as being inherently indispensable to rationalized government. For example, the UN formulated "Fundamental Principles of Official Statistics" to advocate for "sustainable development, peace and security, as well as for mutual knowledge and trade among the States and peoples of an increasingly connected world, demanding openness and transparency."[17] This type of attempt to have jurisdictional control over the meaning of official statistics can have consequential effects through the formation and consolidation of a global network of political organization.

In conclusion, drawing on historical examples and cross-national longitudinal analyses of NSS establishment, this article argues that keeping official statistics serves as a useful technology of statecraft. This technology to varying degrees plays an essential role in democratic state building, capitalist state building, war making, colonial and post-colonial state building, and state building in world society. These multi-faceted, complex processes of state building provide national governments with opportunities, resources, and motivations for establishing national statistical systems to institutionalize the collection of official statistics in order to facilitate the exercise of political power, gain control over populations, and, ultimately, keep societies under states' watchful eyes.

[17] https://unstats.un.org/unsd/dnss/gp/fundprinciples.aspx

Table 1: Descriptive Statistics for Independent Measures

Measures	N	Mean	St. Dev.	Min	Max
Population	6,211	18.169	65.626	0.122	577.290
Democratization	6,211	-3.225	5.593	-10	10
Economic Development	6,211	1.652	2.414	0.326	42.916
War Onset	6,211	1.926	3.745	0	31
Colonialism	6,211	0.712	0.453	0	1
IGO Ties	6,211	14.871	18.416	0	90

Table 2: Event History Analyses of the Worldwide Establishment of National Statistical Systems, 1926 - 2011

	Model 1 Democracy	Model 2 Capitalism	Model 3 War	Model 4 Colonialism	Model 5 World Polity
Control:					
Population……	-0.002	-0.002	-0.005***	-0.004***	-0.005**
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Democratic State Building:					
Democratization…….	0.108***	0.106***	0.109***	0.093***	0.084***
	(0.014)	(0.014)	(0.014)	(0.015)	(0.016)
Capitalist State Building:					
Economic Development…….		0.100***	0.110***	0.096***	0.084***
		(0.019)	(0.020)	(0.020)	(0.022)
War Making:					
War Onset……			0.095***	0.103***	0.086***
			(0.024)	(0.027)	(0.029)
(Post-) Colonial State Building:					
Colonialism……				1.129***	0.727**
				(0.249)	(0.269)
World Polity:					
IGO Ties…….					0.020***
					(0.005)
Region:					
Africa……..	1.134**	1.225**	1.242***	0.994*	0.394
	(0.303)	(0.305)	(0.305)	(0.327)	(0.362)
Asia…….	1.336**	1.435**	1.479***	1.434**	1.239**
	(0.349)	(0.351)	(0.350)	(0.362)	(0.364)
Eastern Europe……...	1.868***	1.615***	1.551***	1.609***	1.417**
	(0.326)	(0.329)	(0.330)	(0.330)	(0.332)
Latin America…….	-0.433	-0.443	-0.687	-1.065*	-1.180**
	(0.326)	(0.326)	(0.335)	(0.351)	(0.355)
Middle East…….	0.530	0.163	-0.192	-0.317	-0.587
	(0.378)	(0.414)	(0.440)	(0.437)	(0.443)
Oceania……...	0.388	0.083	0.028	-0.137	-0.159
	(0.518)	(0.522)	(0.523)	(0.520)	(0.522)
Observations	6,211	6,211	6,211	6,211	6,211
R^2	0.019	0.022	0.024	0.028	0.030
Max. Possible R^2	0.357	0.357	0.357	0.357	0.357

Log Likelihood	-1,309.170	-1,300.561	-1,294.737	-1,282.304	-1,273.156

Note: Coefficients are log odds. Numbers in parentheses are standard errors.
*p<0.05; **p<0.01; ***p<0.001

Table 3: Periodized Event History Analyses of the Worldwide Establishment of National Statistical Systems

	Model 6 19th Century	Model 7 20th Century
Control:		
Population……..	-0.020	-0.003
	(0.017)	(0.003)
Democratic State Building:		
Democratization…….....	0.062	0.095***
	(0.052)	(0.017)
Capitalist State Building:		
Economic Development…….	-0.034	0.076***
	(0.190)	(0.023)
War Making:		
War…….....	0.346***	0.044
	(0.110)	(0.036)
(Post-) Colonial State Building:		
Colonialism…….....	0.275	0.562*
	(0.700)	(0.367)
World Polity		
IGO Ties……..	0.018	0.013*
	(0.046)	(0.005)
Regions:		
Africa……..	-20.058***	1.178*
	(12,244.970)	(0.532)
Asia……..	-0.887	1.956***
	(1.104)	(0.541)
Eastern Europe……	1.070	1.960***
	(0.694)	(0.513)
Latin America…….	-2.706**	-0.276
	(0.922)	(0.527)
Middle East…….	-21.834***	0.327
	(5,508.182)	(0.576)
Oceania……..	--	0.264
	--	(0.637)
Observations	2,944	3,267
R^2	0.014	0.032

Max. Possible R^2	0.117	0.484
Log Likelihood	-162.784	-1,028.503

Note: Coefficients are log odds. Numbers in parentheses are standard errors.
$^{*}p<0.05$; $^{**}p<0.01$; $^{***}p<0.001$

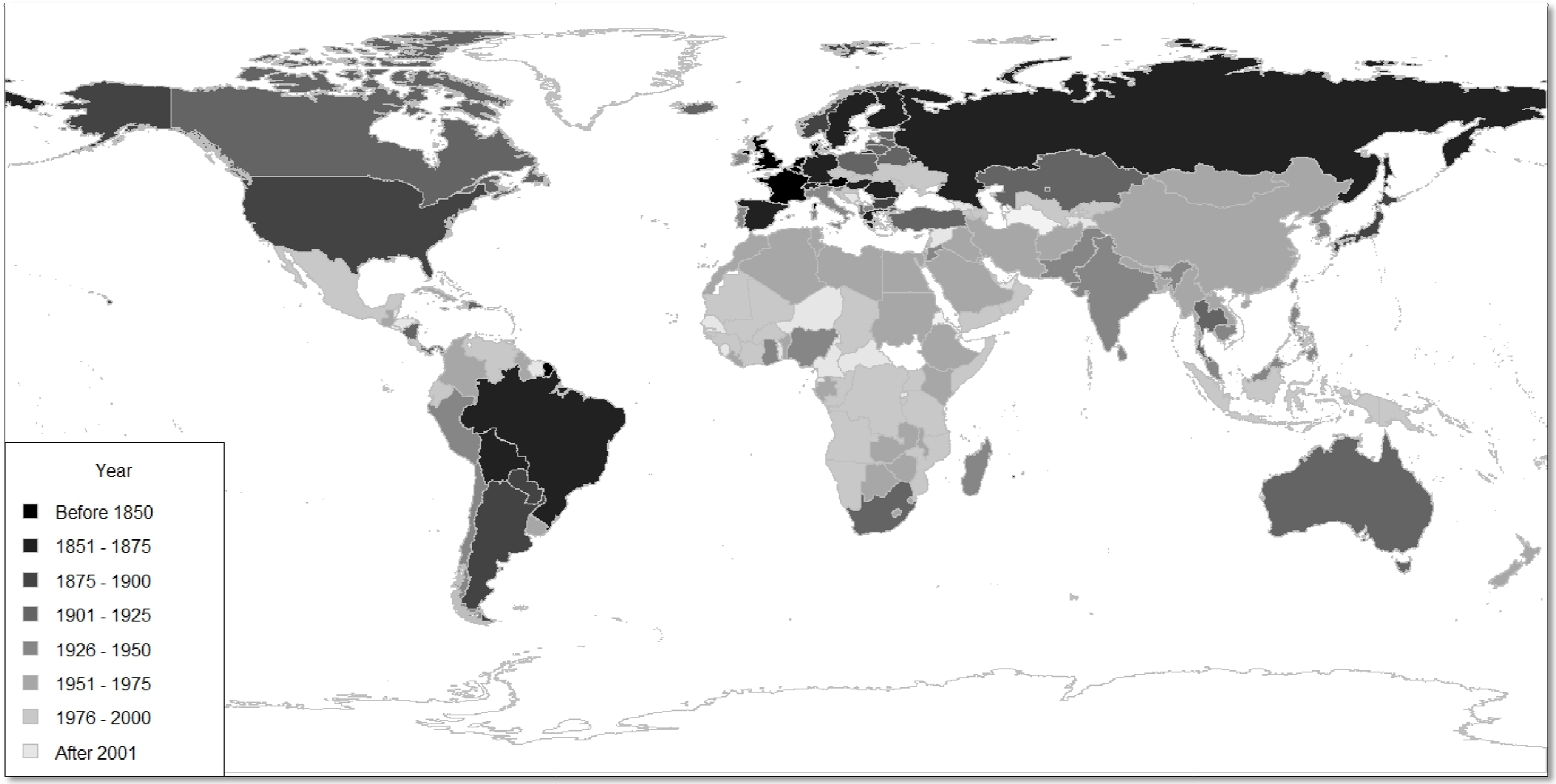

Figure 1: The worldwide establishment of National Statistical Systems, 1826-2010.

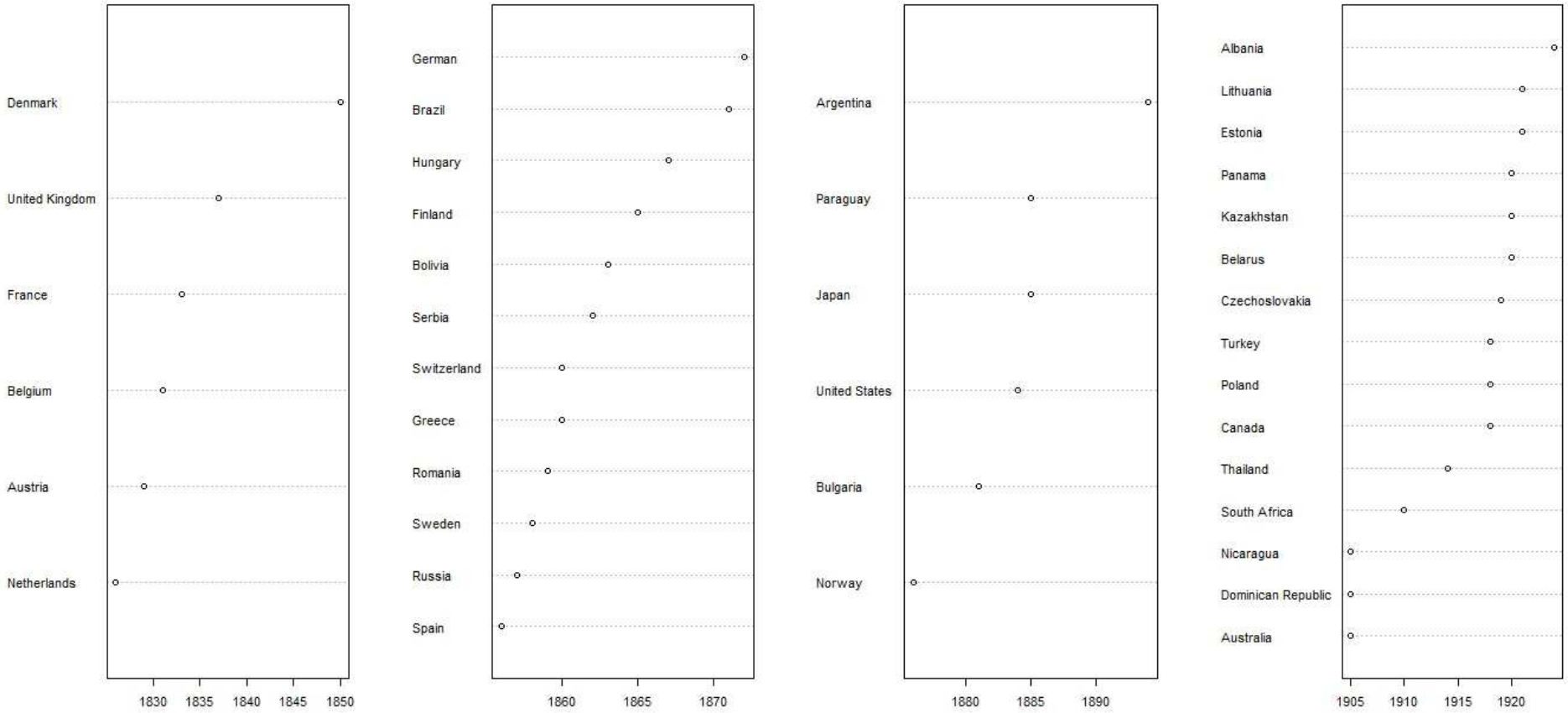

Figure 2a: The establishment of National Statistical Systems by country, 1826-1925

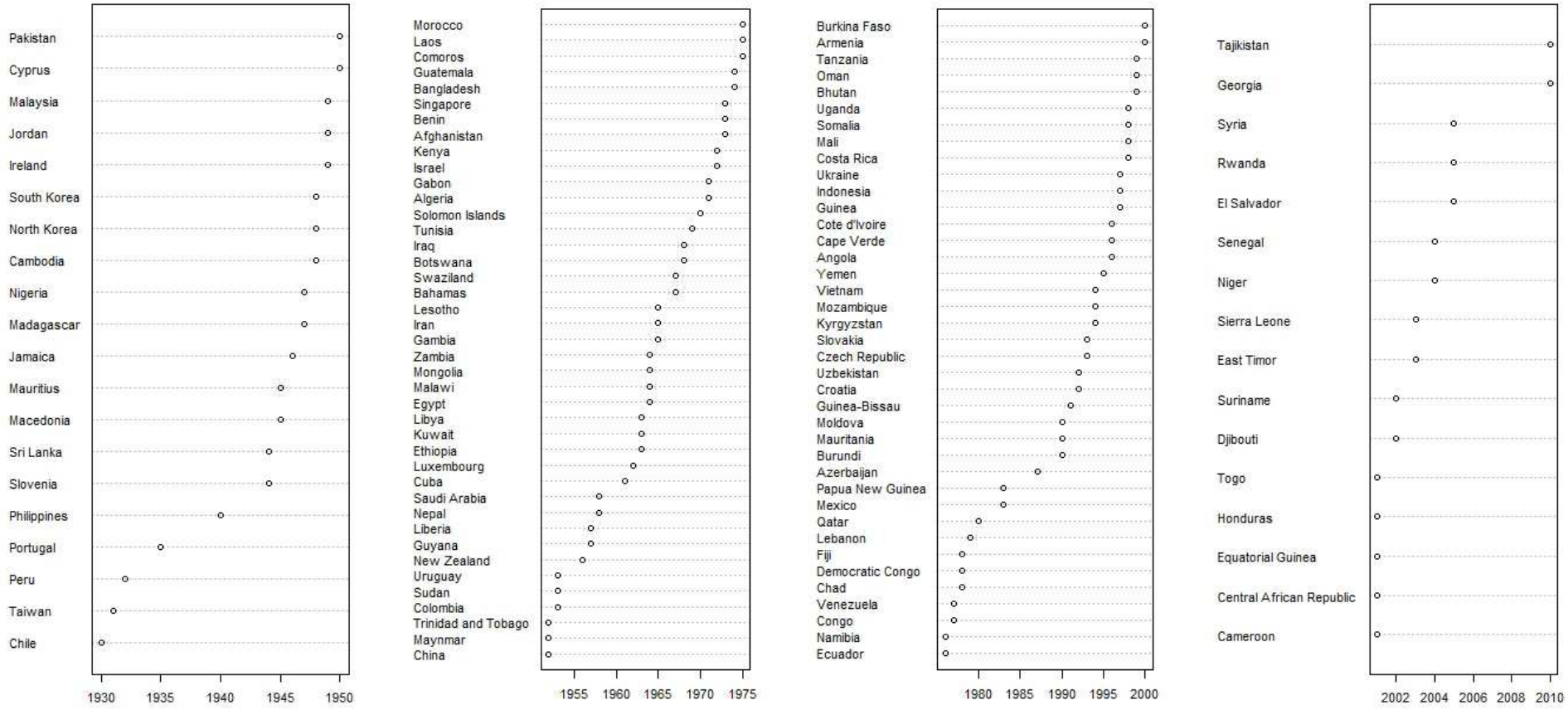

Figure 2b: The establishment of National Statistical Systems by country, 1926-2010

CHAPTER 2

The Global Institutionalization of a Scientific Profession: The Case of Statistics, 1833-2011

INTRODUCTION

Statistics is one of the globally recognized professions. The professional knowledge of statistical science has been widely used in a dazzling array of domains, including social and natural sciences, engineering, politics, business, management, sport, entertainment, and so on. Not only have statistical numbers been indispensable to social and political life, but the science of statistics also has enjoyed a high status among other professions. One hardly can find a professional field that does not require any knowledge about statistics. More importantly, statistics serves as a kind of universal language which transcends cultural differences and national boundaries. In other words, statistics is a global profession.

What accounts for the global professionalization of statistics? Prior to the nineteenth century, statistics emerged as the "science of the state," or *Statistik*, which basically involved documenting the government's activities, and then in the nineteenth century political arithmetic of the English tradition became popular as a tool of recording state activities. It largely contributed to statistical thinking—a new epistemological paradigm—that crystallized in the nineteenth century (Hacking 1990). Historians of statistics have primarily traced the emergence and evolution of statistical science in Europe, such as Britain, France, and Germany (Desrosières 2002b; MacKenzie 1981; Porter 1988; Schweber 2006). In this body of literature, statistics is usually conceived of as a mode of revolutionary thinking that shapes and affects many other modern scientific disciplines. Nevertheless, historical studies of statistical science have not

attempted to perceive it as a profession or theorize the historical trajectory of the professionalization of statistics.

The sociology of professions therefore provides us with theoretical and analytical tools to explain the professionalization of statistics. This literature has focused on certain occupational fields, such and medical and legal professions, offering insights into the complicated and dynamic nature of professionalization (Abbott 1988; Larson 2012; Macdonald 1995; Wilensky 1964). Scholars of professions have shed light on a number of defining features of professionalization, such its sequence, functions, and jurisdictions. However, the theoretical framework offered in this literature has a limitation: professionalization is typically investigated a set of socio-political processes within national boundaries (Fourcade 2006:147). Even though some studies take comparative approaches to the subject, global comparison has received very little consideration. As a result, when it comes to professions with global reach, such as economics and statistics, it is unclear how and why they have been professionalized as the way they are.

This article attempts to bridge the gap between historical research on statistics and the sociology of profession by offering an analytical framework that is able to capture the historical temporality and theoretical substance of the professionalization of statistics as a global profession. In so doing, I tend to develop an argument about the global institutionalization of the statistics profession from the nineteenth to the twentieth first centuries. In addition, I also attempt to be in dialogue with historical studies of statistics and the sociology of profession, with an aim at advancing our understanding of the professionalization of statistics at the empirical level and the institutionalizations of professions at the theoretical level.

This article conducts event history analysis of the worldwide founding of professional

associations of statistics from 1800 to 2014. I explore how both country-level and international characteristics determine the rate of the founding of a professional statistics association. Specifically, I investigate how a country's economic development, democracy, state capacity, colonialism, and linkage to the world polity affect the rate of the founding of a national statistics association. I also conduct separate analysis for the post-1945 period, examining how the rise of higher education influences the institutionalization of the statistics profession.

STATISTICS AS A GLOBAL PROFESSION

Statistics has been a disciplinary field of scientific knowledge on which a variety of other disciplines, both natural and social sciences, have in varying degrees relied. However, in what sense can statistics be seen as a profession? Scholars of profession have proposed a number of elements constituting a profession. First of all, a body of professional knowledge is said to be abstract, generalizing, and self-expanding (Macdonald 1995). In the early twentieth century, statistics transformed from an empirical social science to a mathematical field (Porter 1996b). During this period, some mathematical theorems directly related to statistics were worked out so that statistics assumed a scientific authority as well as mathematical status. At the core of modern statistics lies a set of mathematical principles, which makes the nature of the discipline of statistics mathematical abstract, generalizing, and self-expanding. Abbott (1988) stresses the importance of abstraction to professions and raises the question of how abstract is abstract enough to be professional. In the case of statistics, its mathematical characteristic makes its abstractness self-evident.

Second, credential is another crucial component constituting a profession. In order to be professional, a body of knowledge needs to be credentialed (Larson 2012). Credentials that are

socially acknowledged come in various forms, such as certificates, degrees, and diplomas. These credentials are usually offered by institutions. For example, colleges offer degrees in a wide range of professions. Those credentialed fields of knowledge usually form occupational fields, in which people with credentials are able to show their capability to do professional work. Statistics is, in this sense, a credentialed field of knowledge for two reasons. First, most universities have a statistics department, which offers degrees in statistics. Second, the statistician is an occupation that obviously requires the expertise of statistical knowledge.

What makes the profession of statistics unique the worth being analyzed sociologically is that it is a worldwide profession. Although a number of professions are transnational, such as accountancy, medicine, and law, statistics is one of the very few worldwide professions that have a universal language. Unlike the legal profession, for instance, which is regulated according to national or local codes, practices, and culture, statistics' professional authority is not only worldwide but also based on its body of abstract knowledge. Statisticians from different countries use a common language—mathematical statistics—to communicate and exchange ideas. Despite the fact that different statisticians may apply statistics to different empirical domains and data collections, its core body of abstract knowledge makes it possible to be a global enterprise.

Fourcade (2006) argues that the profession of economics—another prominent example of global professions—enjoys a transnational authoritative status in that its jurisdiction struggles occur at the international level in the very beginning. The jurisdiction of the statistics profession, however, may not be entirely established at the global level. Instead, as elaborated above, the scientific authority of statistics is primarily based on its mathematical abstraction, which lies at the heart of it. It is important to note that statistics as a branch of applied mathematics was not

the case until the 1930s. Before the early twentieth century, practices of the statistics expertise were primarily concentrated in the political domain, such as collecting official statistics, and professional statisticians were mostly engaged in political affairs or policymaking (Hacking 1990; Porter 1988).

EXPLAINING THE FOUNDING OF PROFESSIONAL ORGANIZATIONS

Professional organizations are one of the pillars for modern society. In the case of statistics, it is the professional statistics association that represents, both symbolically and substantively, the profession of statistics. For example, the American Statistical Association (ASA), founded 1839, has 18,000 members. One of its main objectives is to "advance the statistics profession."[18] In the ASA's 1840 circular, it describes:

> An institution has been formed in Boston by the name of the American Statistical Association, for the purpose of collecting, preserving and diffusing statistical information in the different departments of human knowledge. One of the methods which the Association proposes to take in accomplishing this objective is to procure, by solicitation or otherwise, books, pamphlets, periodical works and written communication, relating to the subject of Statistics. It is also their intention to promote the science of Statistics (Mason and Jr 2015).

Scientific associations, such as the ASA, can be perceived of as an indicator of the institutionalization of scientific activity (Schofer 2003). But what explains the founding of professional organizations? Institutional approaches to organizations have been concerned with

[18] http://www.amstat.org/

the influence of states on organizations. One of the questions that are frequently asked is: Do state governments have institutional impact on the founding of organizations? There are two ways in which government can have an effect. First, a state directly shapes organizational behavior. Second, a state indirectly shapes an industry through the mediation of the market. The first mechanism is the direct effect of states on organizational behavior. Some authors define the state as a legal entity. Dobbin and his colleagues (1993) present an image that firm managers comply with laws in different ways. Similarly and more specifically, Edelman (1992) demonstrates that organizations would respond to laws by constructing meanings of compliance with them, securing legitimacy and maintaining managerial interests. In Edelman's analysis, the state can be seen as a set of laws with which organizations sense there is a need to comply. One of the goals of The 1964 Civil Rights Acts and related laws is to regulate organizations' practice of equal employment opportunity and affirmative action (EEO/AA). Yet EEO/AA laws are ambiguous, leaving out large room for organizations to make their own interpretations. As a result, different organizations respond to legal regulations differently. Some are faster to establish EEO/AA offices and policy and some others slower. Edelman's analysis shows that even though organizations do not passively abide by laws, states do have impact on the employment practice of organizations.

Kelly and Dobbin (1999) also explain how organizations respond to legal institutions. They begin with a fact that, before the Family and Medicine Act, many organizations had maternity leave program, wondering what accounts for this. The Civil Rights Acts, again, played an important role. Kelly and Dobbin argue that organizations created maternity leave rules to respond to courts' explanation for the Civil Rights Acts. However, organizations sometimes adopt contradictory strategies in response to laws. Sutton and Dobbin (1998) find that grievance

procedures and employment-at-will are two opposite responses to EEO/AA regulations. What makes a difference to organizations' reactions to laws is that, they argue, both of the responses are ambiguously allowed by laws. In other words, the federal government created an uncertainty so that organizations can adopt dissimilar compliance strategies. In this sense, state's effect on organization is salient, but, under different circumstances, never unitary. In sum, "Organizations created new offices not because the law dictated that they do so but because the law did not tell them what to do" (Dobbin and Sutton, 1998: 470). In other words, "the federal state is administratively weak but normatively strong" (441).

The second mechanism of states' effect on organizations contains two steps. The first step is that states influence the economy and the second is that the economy influence organizational behavior. In capitalist societies, markets are fundamental and constitutive institutions and able to enormously shape organizational behavior. Moreover, stated the economy is also to varying degrees shaped by states. It is, thus, worth theoretically considering how the state alters organizational behavior through the mediation of markets.

Institutional approaches to organizations have offered rich findings of how the economy/market shape organizational behavior. Haveman (1993) examines rates of savings and loan organizations' entry into non-residential mortgages, mortgage backed securities, consumer loans, commercial loans, real estate, and service corporation subsidiaries markets, finding that markets' structures matter. More specifically, the number of successful organizations already in the markets has impact on other organizations' rate of entering the markets. In addition, large and profitable organizations are the model for those organizations wanting to join. Carroll and Swaminathan (2000) have a similar concern. They study the brewing industry, specifying how specialists can survive and even be more competitive in the markets that there are already many

generalists. Those specialist organizations which developed an identity of anti-mass production, in fact, can be more successful in the brewing market than other organizations which did not do so. All in all, Haveman (1993) and Carroll and Swaminathan (2000) both show the structure of markets can largely change the pattern of an industry to which organizations are susceptible.

Yet, according to Fligstein (1996), markets are political, which partly means states play a role in the construction and transformation of markets. Several studies can provide us with insights into states' role in shaping markets. Howard (1999) demonstrates how policy can change markets and related industries. Since American government had implemented the policy of home mortgage interest deduction, relevant actors altered their strategies and behavior in the real estate market. More people would like to buy rather than rent houses. As a result, the real estate market expanded and more businesses tended to enter the market. Tax expenditure policy also indirectly subsidized other markets, such as social services, health care, child care, and so on. This mechanism, different from welfare policy's impact on citizens, by Howard, is called a "hidden welfare state."

To sum up, institutionalist analysts have shown how organizations could be shaped by institutions of markets and the state. While ecologists highlight the direct effect of markets on organizations, political institutions are capable of directly influencing industries through policy regulations. Also, they can indirectly shape organizations through influencing the constitution of the economy. In other words, both political and economic institutions matter to the founding of professional organizations

PROFESSIONALIZAING AND POLITICAL INSTITUTIONS

Professions are one of the defining features of modern societies. But what is the relationship

between professions and politics? Studies of professions have argued for the importance of the state's role in professionalization (Abbott 2005; Macdonald and Ritzer 1988; Portwood and Fielding 1981). For instance, in Portwood and Fielding's (1981) analysis, of professional statuses, the relationship between profession and state is discussed and highlighted. Halliday's (1985, 1987) analyses of the legal profession also emphasize the role of the British state in the professionalization. Generally, the establishment of profession is inextricably linked to political institutions. To gain its autonomy and authority, a profession has to navigate complex political arenas because the state has power of licensing and to construct both product and labor markets, which are indispensable to the professionalization of a field.

Professional autonomy is also linked to state formation. In Johnson's (1982) analyses of the English legal system in the 1830s and 1840s, he explains how the British legal profession developed in the context of, and institutionally connected to, the British Empire. From this perspective, there are three processes at work that co-produce the autonomy of a profession: state formation, elite intervention, and social mobilization. Johnson argues:

> The transition to capitalism in England was not marked by a separation of economic and political institutions, but by an historically unique articulation which involved the interrelated processes of state formation and professionalisation. [T]he processes … of professionalisation are integral to the process of state formation. … The history of this relationship is not one of original separation followed by intervention or resistance to intervention. (Johnson, 1982: 188, 190) (quoted from Macdonald 1995)

In the case of the statistics profession, political institutions, including the states and its effects,

are expected to be crucial. Take the American Statistical Association (ASA) for example. The ASA was actively engaged in American census taking and policymaking in the nineteenth century and early twentieth century. Its founding members were either elite or government officials. A number of its pioneering statisticians also held governmental positions or worked as consultant to the American government (Anderson 1990a). The ASA was willing to cooperate with, and provide a service for, the American state. In so doing, it could increase its professional authority and influence.

Democratic institutions lie at the center of the relationship between the ASA and the American state. The American Constitutions mandates the implementation of regular censuses in order to apportion Congressional seats. But before 1902 there was no independent government agency responsible for taking censuses. In the late nineteenth century, ASA members together with other like-minded supporters began to lobby for a federal census office that is in charge of decennial census taking. The US Census Bureau was finally founded in 1902, and this success was not possible without ASA statisticians' lobbying efforts (Anderson 1990a). In this regard, democracy serves as one of the foundations that strengthen the authoritative role in the process of professionalization.

TAKING THE WORLD POLITY INTO CONSIDERATION

Global rationalization gave rise to the modern professions. Macdonald argues:

> The process of formal rationalization has generated a new type of knowledge, namely, the systematic, codified, generalized (which implies abstract) knowledge of the means of control (of nature and of humans). Most importantly, it has resulted in knowledge of how

> to acquire new knowledge of such means. Science and technology are important elements of this new knowledge, but it cannot be reduced to science and technology. Knowledge of how to calculate market profitability, to organize and plan in bureaucracies, and to develop, apply and predict the abstract codified laws of the legal system have all been developed under the process of formal rationalization. This formally rational abstract utilitarian knowledge has resulted in new means of control (over nature and over other groups) and is a form of knowledge which is quantitively and qualitatively different from the previous practical knowledge and the status-cultural knowledge. (Macdonald 1995)

Moreover, based on the perspective of rationalization, the world polity approach to organizations sheds light on institutional durability and changes of rationalized culture not only at the global level but also at the nation-state level (Meyer 2010; Meyer et al. 1997). Furthermore, rationalized environments facilitate the diffusion of institutional innovations and isomorphism (Meyer and Rowan 1977b; Strang and Meyer 1993; Strang and Soule 1998). Within this framework, rationalization—the pursuit of efficiency, calculation, and prediction—is to be perceived as consisting of multilayered and differentiated processes of institutional change. The ubiquitousness of social statistics not only exemplifies the rationalization of the social world but also shall be better illuminated by world society theory.

More specifically, the statistics profession embodies another global movement of rationalization: scientization. As mentioned previously, science-related practices and activities have dramatically expanded in the twentieth century (Drori, Jang, et al. 2006b; Drori and Meyer 2006, 2006; Schofer 2004). This dramatic growth "acts as a basis for organizational formalization and proliferation" (Drori and Meyer 2006:50). Organizations—as well as nation-

states—play a central role in contemporary society: they are constructed as agentic "actors"—which are empowered by the rationalized, scientized environment (Drori et al. 2009; Meyer 2010; Meyer et al. 1997; Meyer and Jepperson 2000). In addition, nation-states and organizations contribute to the enactment of various institutions. As discussed earlier, not only was social statistics created to enhance states' governmentality, but its accomplishment also needs organizational endeavor. In this regard, social statistics—its diffusion, institutionalization, and change—is, theoretically and empirically, intertwined with states and organizations.

In sum, an adequate analytical framework for understanding the global professionalization of statistics should take into account a rationalized, scientized environment that facilitates the diffusion and institutionalization of professions.

RESEARCH DESIGN

To explore the global institutionalization of statistics as a scientific profession, I analyze the founding of professional statistics associations all over the world from 1800 to 2011. In the analyses that follow, I test both the effect of national and international characteristics on the founding of statistics associations. This is because those associations, which are are national ones, are founded in a country. As discussed above, I hypothesize that country-level and the world-level factors both affect the global professionalization of statistics.

Dependent Variable

The dependent variable in the analyses is the rate of the founding of a professional association of statistics in a country. The data primarily come from multiple sources. First, *World Guide to Scientific Associations and Learned Societies* (Kirchner 2004) offers varieties of learned

societies around the world from 1800-2004. Information that the *Guide* has about statistics associations includes a statistics association's name, number of members, founding time, address, contacts, periodicals it publishes, short introduction, and events it holds. Second, *Directory of Scientific and Engineering Societies in Sub-Saharan Africa* (American Association for the Advancement of Science 1985) primarily offers information about learned societies in Africa, serving as a complementary source to the first one. The *Directory* offers information on a professional society's name, founding time, address, and contact information. Third, *Science Reorganized: Scientific Societies in the Eighteenth Century* (McClellan 1985) also contains information about statistics associations, including name, founding time, address, contacts. Fourth, I conducted extensive web search to complement the data sources discussed above. In sum, these data sources help construct the dependent variable of the founding of statistical associations, which is the measure of the institutionalization of the statistics profession in a country. Figures 1and 2 present a global, macro founding pattern of professional statistics associations from 1800 to 2014.

(Figures 1 and 2 about here)

Independent Variable

The event history analysis shown below aims at testing arguments about the national and international factors that influence a country's institutionalization of the statistics profession. All the independent variables are measures of the factors that are hypothesized to affect the dependent variable. Moreover, the independent variables included in the analyses below, unless otherwise noted, are all time-varying and measured on a yearly basis. Table 1 presents the

Pierson Correlation Coefficients and Table 2 lists the descriptive statistics of all the independent measures.

(Tables 1 and 2 about here)

Populations.— The population of a nation-state, compiled from Correlates of Wars (COW) (Singer and Small 1994), is a time-varying variable updated on a yearly basis. It serves as a control variable.

Economic Development.—This is a variable used to test the argument about the effect of a country's economic development on the founding of professional statistics association. It is measured by domestic product per capita (GDP), which is commonly used in cross-national analyses. Data on GDP are compiled from the Maddison Project (Bolt and Zanden 2014) and the World Bank.[19] Missing data are extrapolated by means of exponential smoothing.

Democratization.—To test the argument about the effect of democracy on the founding of statistical professional associations, I include a measure of democracy from Polity IV (Marshall et al. 2008). The variable is a scale from -10 to 10, representing a country's degree of institutionalized democracy in a particular year (from low to high). Missing values are interpolated to allow for a more complete analysis of the entire period.

National Capacity.—To test the argument about the effect of a nation-state's capacity on the founding of a statistical association, I include a composite variable measured by military expenditure, military personnel, energy consumption, urban population, and total population, and steel and iron production and consumption (in thousands of tons). It is compiled from the National Material Capabilities Data (Singer, Small, and Small 1993). Missing data are

[19] The World Bank's website: http://data.worldbank.org/

extrapolated by using the method of exponential smoothing.

Colonialism.—To test the argument about the effect of colonialism on the founding of professional associations of statistical science, I include an indicator of whether or not a country was colonized prior to independence. If a nation-state was colonized before reaching independence, then the dummy variable of *Colonialism* is coded 1, and 0 otherwise. Data on colonization are obtained from the Issue Correlates of War (ICOW) Project (Hensel and Mitchell 2006).

World Polity.—To examine the effect of the world polity on the founding of professional associations of statistics, I include a variable that measures the linkage to the world polity. This is measured by the number of inter-governmental organization (IGO) memberships for a country. Data on IGO membership come from the Correlates of War (COW) Project's Intergovernmental Organizations Data Set (Pevehouse et al. 2004).

Region.—Lastly, I include geographical dummies (Africa, Asia, Eastern Europe, Latin America, Middle East, and Oceania; the reference group is Western Europe and North America) to capture regional variations.

Estimation Methods

The rate of the founding of statistics associations is estimated by the Cox proportional hazard model. This modeling framework belongs to the event history method broadly defined. Within this framework, nation-states are seen as being "at risk" of founding a professional statistics organization since independence. In other words, each nation-state has "hazard rates" of founding a statistics association. The hazard rate function, $\lambda(t)$, can be written as,

$$\lambda(t) = \lim_{dt \to 0} \frac{Pr(t \leq T < t + dt)}{dt \cdot S(t)}$$

(Figure 3 about here)

where *t* is survival time and $S(t)$ is a survival rate function. The distribution of survival time leads to different types of event history models. One of the most common approaches is the Cox model (proportional hazard model), which assumes survival time to be exponentially distributed. More important, a Cox model allows the hazard rate to be an exponential function of an array of independent variables.

$$\lambda\big(t\big|X_i(t)\big) = \lambda_0(t) \cdot \exp(X_i(t) \cdot \beta),$$

where $\lambda_0(t)$ is the baseline hazard, and β is the vector of covariates. Figure 4 shows average hazard rates of founding a professional statistics association over time. Note that since most of the covariates in my analyses are time-varying variables, $X_i(t)$ denotes the value of a vector of covariates for nation-state *i* at time *t*. As noted earlier, the unit of observation is the country-year and years following the founding of a statistics association in a country are excluded from the analyses because the country is no longer "at risk" of founding a statistical association. Furthermore, since the dataset is an unbalanced panel, it is reasonable to assume the observations are correlated or clustered at the country level. Instead of partial likelihood estimation usually used in Cox models, the specification of clustered observations requires other estimation techniques, such as Generalized Estimating Equations (GEE) or Generalized Mixed Effects Models (ME). For the analyses presented in this article, GEE serves as an appropriate estimation

technique in that the purpose of my analyses is not to tease out some specific random (mixed) effects and GEE provides "robust standard error" estimates (also referred to as Huber–White standard error estimates) (Hardin and Hilbe 2012). To fit GEE proportional hazard models, I used software R and its package, *survival*.

RESULTS

(Tables 3 about here)

Table 3 presents the results for GEE proportional hazard models of the rate of founding a national statistics association from 1800 to 2011. Model 1 in Table 3 is designed to test the effect of economic development. It shows that a country's economy does not have significant effects on the rate of founding a professional statistics association in the entire period. Model 2 of Table 3 adds the variable of democracy to examine its effect on the rate. As this model shows, there is a significant effect of democracy on the rate of founding a national statistics association. Model 2 of Table 3 is designed to test the effect of national material capacity. The coefficient is not significant but is in the positive direction. Model 4 is meant to test the argument that whether the founding of statistical association is a colonial legacy. But the coefficient of colonialism is negative, implying that colonialism did not accelerate, but delayed, the rate of founding a statistics profession. Model 5 adds the world polity variable, which is measured in terms of linkage to intergovernmental organizations. It demonstrates that the world polity has a significant and positive effect on the rate of founding a national statistics association. Note that the coefficient of national capacity turns significant in Model 5.

Model 5 of Table 3 is also a full model, which deserves further interpretation. This model takes into account all independent measures that are hypothesized to have effects on the rate of founding professional statistics association. First, the coefficient of economic development is negative but not significant. Second, as expected, the coefficient of democracy is significantly positive. Democracy therefore accelerates the founding of professional statistics associations. Third, the effect of national material capacity is in significantly positive, which means that a one increase in this measure will make the rate of founding statistics associations nearly sixty times quicker (exp[4.08]=59.14). Fourth, linkage to the world polity generally accelerates the rate of founding a professional statistics association for all countries. Fifth, as discussed above, *colonialism*'s effect is insignificant in this model.

(Table 4 about here)

Model 6 of Table 4 shows results from the periodized analysis of the pre-1945 period and Model 7 of the post-1945 period. For the period before 1945, national material capacity and the world polity are two significant factors that accelerated the rate of founding professional statistics association. By contrast, for the period after 1945, the coefficient of national capacity turns negative and insignificant. Democracy, the world polity, and colonialism are significant factors affect the rate of founding statistics associations.

Regional Variations

Models 1 to 13 in Tables 3 and 4 also include regional dummies as controls, which are designed to differentiate the regional variations in the rate of founding a professional statistics association.

As the results show, in general, compared with Western Europe and North America, which serve as the reference group in all Models, professional statistics associations are founded at a lower rate in Africa, Asia, Eastern Europe, Latin America, the Middle East, and Oceania. For example, Model 5 in Table 1 shows that Latin American countries are significantly about nine times slower to found a statistics association (exp[-2.17]=0.11). Additionally, Model 5 shows that, while the coefficients for the Middle East and Oceania are negative, they are not significant; countries in the Middle East are significantly three times slower to have a professional statistics association founded (exp[-1.21]=0.30).

DISCUSSION AND CONCLUSION

Event history analysis demonstrates how the rate of creating professional statistics associations is affected by both national and international factors. Historical research on statistics has not approached statistics as a profession and previous research on professionalization has not offered an adequate framework for explaining how global professionalization is possible. This article develops an institutionalist framework to take into account conditions under which the statistics profession is able to be established.

The results demonstrate that democracy, national material capacity, the world polity, and colonialism all affect the rate of founding a professional statistics association. For the entire period of 1800-2014, democracy is an important factor for the professionalization of statistics. Two mechanisms are at play. First, developing a profession requires a government that is supportive, or at least a state that allows for its development. In non-democratic or authoritarian countries, professions are less likely to have autonomy because the state has a full control over the development of professions. Second, there is a selective intimacy between statistics and

democracy. The operation of democratic politics heavily relies on statistical techniques and calculation to apportion representations and inform policymaking. In a democratic political environment, both social and political actors cannot effectively and efficiently communicate without gaining sufficient information on society. In this sense, statistical information gathering plays a prominent role in democratic politics. To play the democratic game, politicians in general and government officials in particular need to have a good grasp of competitors, constituencies, and public opinion. Statistical technologies, therefore, serve as efficient tools for collecting the information they need in terms of policymaking (Herbst 1995; Prasad 2012) or running election campaigns (Kelman 1987; Starr 1987).

Furthermore, national material capacity is another salient factor that matters to the professionalization of statistics. National material capability serves as material origin of the possible advancement of new sciences and technologies, the political institutionalization of which simply requires vast resources. Therefore, countries with more material resources are more quickly to have the statistics profession established. In other words, resources that a country has provide necessary resources to develop and establish the statistics profession.

The world polity measured by international linkage to intergovernmental organizations contributes to the global professionalization of statistics. The event history analyses find a robust association between intergovernmental connections and the rate of founding a professional statistics association, implying that the cultures and politics of world society play a crucial role. This finding is generally consistent with arguments made by world polity scholars, who highlight the importance of worldwide cultures and interlinks among nation-states for various processes of diffusion and institutionalization (Drori, Meyer, et al. 2006; J. W. Meyer 2002; Schofer 2003; Schofer and Meyer 2005; Soysal and Strang 1989; Ventresca 1995b). As a result of worldwide

cultural isomorphism, statistical science and technology percolates through the world when the world becomes more connected and structured, where intergovernmental links serve as channels for the global diffusion of the statistics profession. This finding is also in line with the picture portrayed in histories of statistical science and technologies, which point out that statistical thinking began to emerge in eighteenth- and nineteenth-century Europe (Daston 1988; Hacking 1990; MacKenzie 1981; Porter 1988). Specifically, because most early adopters are European states, intergovernmental activities provide late adopters with more opportunities to learn, acquire, and practice statistical science and technology. The International Statistical Conference (ISC) in the nineteenth century and the United Nations' Statistics Division in the twentieth century are two intergovernmental organizations that exemplify this diffusion perspective.

Another key finding suggests that colonialism significantly decreased the rate of founding a professional statistics association for the post-1945 era. Historically, Western colonizers pioneered the development of statistical technologies to gather information on the colonized (Hansen 2015; Penny and Bunzl 2003; Stagl 1995). Colonized peoples were "objectified" (Brockway 1979; Vicziany 1986). However, in the case of statistical science, colonialism does not encourage the founding of a professional statistics association. This finding should be interpreted with caution because results also show that most non-Western countries are slower in the professionalization of statistics and this delay might not be caused by colonialism. But in general, the professionalization of statistics comes into being at a much slower rate in the non-Western world.

Lastly, there is temporal variation. In the nineteenth century nation-state builders, national material capacity is the only factor that encourages the professionalization of statistics. In contrast, in the twentieth century, statistics professionalization is influenced by democratic

politics, national capacity, the world polity, and colonialism. This distinction is consistent with the histories of the development of statistical science and technology (Desrosières 2002a; Hacking 1990; Porter 1988). But in the twentieth century, there were waves of democratization (Huntington 1993), and the world was more connected (Meyer et al. 1997).

In conclusion, beginning by noting that previous historical research on statistics does not offer the theoretical framework for understanding the professionalization of statistics and literature on professions often ignores the global dimension of professionalization, this article offer an integrated, institutionalist framework to account for the global professionalization of statistics from 1800 to 2014. Although there are regional and temporal variations, democracy, national material capacity, colonialism, and the world polity all to varying degrees affect the conditions under which the statistics profession is able to be established.

Table 3: Event History Analysis of Founding of National Statistics Associations, 1833-2011

	(1)	(2)	(3)	(4)	(5)
Population	0.005**	0.005***	0.005**	0.005**	0.003
	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)
Economic Development	0.012	-0.003	-0.002	-0.002	-0.044
	(0.016)	(0.021)	(0.021)	(0.021)	(0.037)
Democracy		0.080***	0.082***	0.083***	0.059*
		(0.021)	(0.022)	(0.022)	(0.023)
National Capacity			1.789	1.753	4.081*
			(3.921)	(3.975)	(3.517)
Colonialism				-0.020	-0.412
				(0.361)	(0.391)
World Society					0.030***
					(0.007)
Africa	-0.269	-0.057	-0.004	0.007	-0.718
	(0.357)	(0.364)	(0.385)	(0.429)	(0.511)
Asia	-1.340**	-1.109	-1.045	-1.036	-1.251
	(0.557)	(0.570)	(0.588)	(0.608)	(0.611)
Eastern Europe	-0.483	-0.388	-0.356	-0.350	-0.582
	(0.428)	(0.429)	(0.436)	(0.451)	(0.467)
Latin America	-1.912***	-1.882***	-1.835***	-1.822**	-2.173***
	(0.523)	(0.524)	(0.536)	(0.581)	(0.607)
Middle East	-1.437**	-0.906	-0.853	-0.845	-1.212*
	(0.636)	(0.653)	(0.665)	(0.679)	(0.692)
Oceania	-0.132	-0.630	-0.597	-0.587	-0.471
	(0.757)	(0.763)	(0.767)	(0.791)	(0.805)
Observations	11,668	11,668	11,668	11,668	11,668
R^2	0.002	0.004	0.004	0.004	0.005
Max. Possible R^2	0.090	0.090	0.090	0.090	0.090
Log Likelihood	-537.844	-530.566	-530.473	-530.471	-520.394

Note: Coefficients are log odds. Numbers in parentheses are standard errors.
*p<0.05; **p<0.01; ***p<0.001

Table 4: Event History Analysis of Founding of National Statistics Associations, 1833-1944 and 1945-2011

	(6) Before 1945	(7) After 1945
Population	0.003	0.012
	(0.004)	(0.007)
Economic Development	-0.181	-0.027
	(0.211)	(0.034)
Democracy	0.012	0.061*
	(0.054)	(0.027)
National Capacity	7.836***	-52.993
	(3.678)	(36.165)
Colonialism	0.982	-1.456**
	(0.736)	(0.457)
World Society	0.074*	0.023*
	(0.028)	(0.010)
Africa	-18.222***	-0.424
	(6,274.517)	(0.713)
Asia	-1.458	-1.309
	(1.427)	(0.880)
Eastern Europe	-1.141	-0.195
	(0.826)	(0.720)
Latin America	-2.588*	-2.074*
	(0.969)	(0.857)
Middle East	-18.682***	-0.963
	(5,891.641)	(0.833)
Oceania	-19.300***	0.066
	(15,858.250)	(0.967)
Observations	5,559	6,109
R^2	0.005	0.007
Max. Possible R^2	0.051	0.113
Log Likelihood	-131.474	-344.673

Note: Coefficients are log odds. Numbers in parentheses are standard errors.
*p<0.05; **p<0.01; ***p<0.001

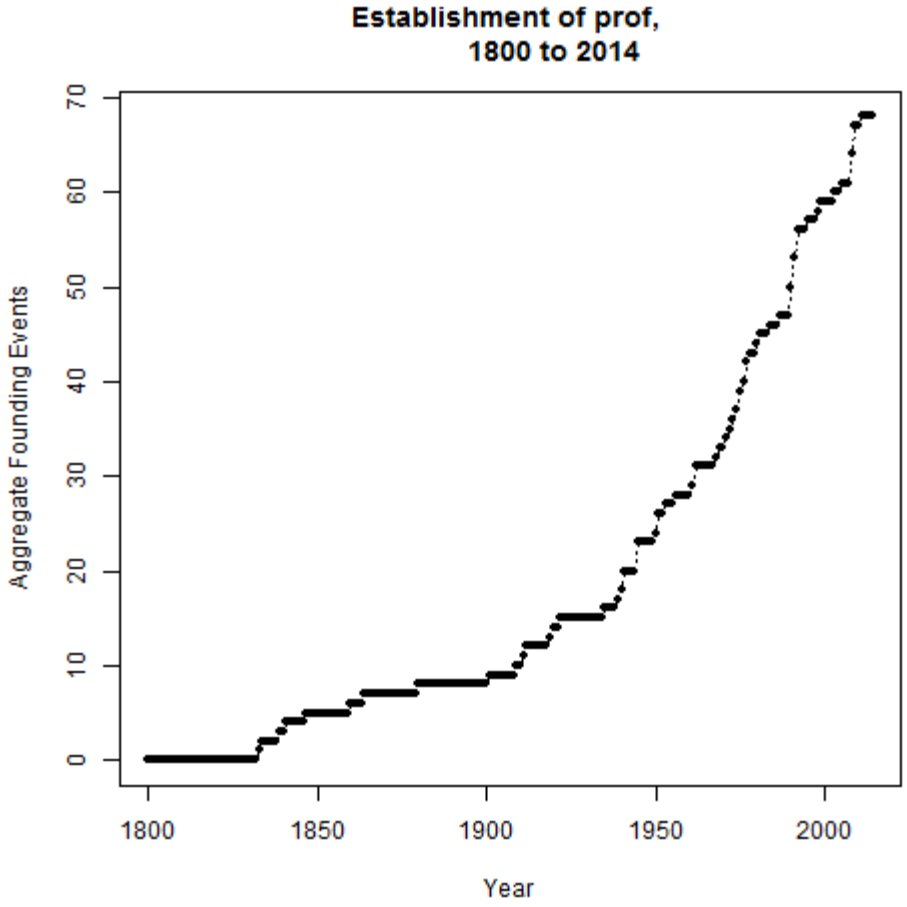
Establishment of prof,
1800 to 2014
Aggregate Founding Events
0
10
20
30
40
50
60
70
1800
1850
1900
1950
2000
Year

Figure 1

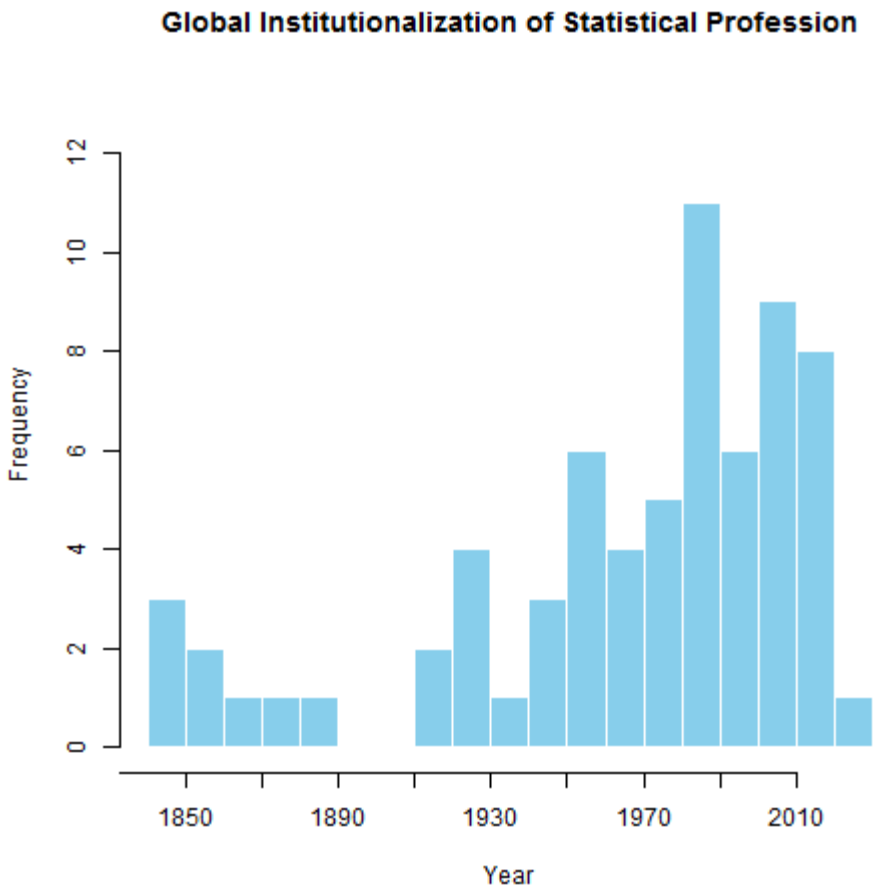
Global Institutionalization of Statistical Profession
Frequency
0
2
4
6
8
10
12
1850
1890
1930
1970
2010
Year

Figure 2

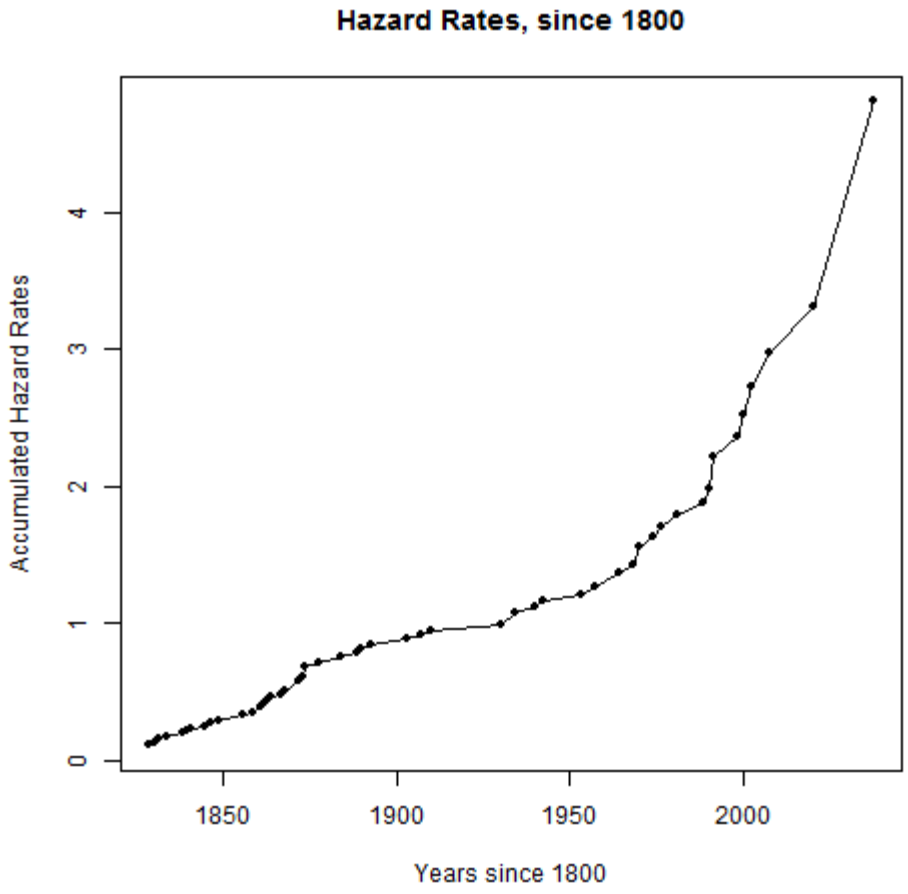
Hazard Rates, since 1800
Accumulated Hazard Rates
0
1
2
3
4
1850
1900
1950
2000
Years since 1800

Figure 3

CHAPTER 3

The Criminological State: Criminal Statistics and State Powers

INTRODUCTION

Research on the relationship between state and criminal justice has addressed related topics including incarceration, corrections, and punishment. Similar terms are coined by scholars to characterize the state in the contexts of those theoretical foci, such as "the police state" (Barret-Kriegel 1992), "the punitive state" (Frost 2006), "the carceral state" (Sim 2009; Weaver and Lerman 2010), and "the penal state" (Garland 2013; Wacquant, Behrent, and Zamora 2016). While shedding light on the various ways in which the state engages in crime control, this literature has surprisingly overlooked one of the most important building blocks for a state's criminal justice system: official criminal statistics. This neglect is problematic because the collection of crime statistics has been widely institutionalized. In nineteenth-century Europe, numbers on deviance and crimes, so-called "moral statistics," were already collected by local or central governments (Hacking 1990; Porter 1988). Entering the mid-twentieth century, with the advancement of statistical technology (e.g., scientific sampling), state bureaucrats began to systematically not only gather but also analyze criminal statistics. For example, since 1979, federal government agency U.S. Bureau of Justice Statistics (BJS) has been in charge of collating criminal data on the American population. This empirical fact begs the question of *why* the American state routinely gathers criminal statistics.

The key to answering this question is a more adequate theoretical framework for understanding the relationship between criminological knowledge, crime statistics, and state power. Criminology as a disciplinary field of knowledge has been critical examined by Foucault (2009) and Foucauldian scholars (e.g., Burchell et al. 1991; Rose and Miller 1992). The Foucauldian approach to criminological knowledge, mainly inspired by *Discipline and Punish*

(Foucault 1977), is built on the assumption that the shaping of criminological knowledge is inevitably intertwined with the deployment of disciplinary power. This focus on power-knowledge relations undergirds Foucault's research on governmentality, which is mainly concerned with the question of how the micro-physics of power is enabled by governmental rationality and the technology of power. Governmentality is also closely related to Foucault's another concept: biopolitics. It refers to the regulation of a population by the decentralized employment of governmental instruments. Taken together, theories of governmentality and biopolitics characterize the ambivalent nature of criminology as a form of disciplinary knowledge.

But although the Foucauldian approach has revealed that criminological discourse serves as a technology of social control (e.g., De Lint 2006; Garland 1992; Pasquino 1991), this literature surprisingly almost overlooks the role of criminal statistics. This neglect is problematic in that the construction of both correctional and critical criminological knowledge to varying degrees relies on the presentation and analysis of statistical data on crime. Moreover, Foucauldian analysis of governmentality suffers from a second problem: While it focuses on power dynamics and relations, state power is a concept epistemologically incompatible with the Foucauldian framework. The absence of the state in the Foucauldian formulation of political power renders theories of governmentality and biopolitics unnecessarily flawed for understanding the power-knowledge dialectics of criminology because the state is usually the only organization that has sufficient resources and authority to gather statistical data on crime.

This article remedies these problems by more adequately theorizing the relationship between governmentality, biopolitics, and state power. According to Bourdieu (2015), the purpose of the state's collecting statistical data on its population is to accumulate symbolic

capital, which is one of the sources of the state's powers. Based on this foundational formulation and drawing on other scholars' works, I argue that collecting criminal statistics is perceived as a useful tool for facilitating the deployment of the state's symbolic power, biopower, and disciplinary power. This theoretical framework is applied to analyzing the American state's efforts to institutionalize the nation-wide systematic collection of criminal statistics: In the 1960s, the Johnson administration waged a "war on crime," which was followed by a series of policies toward building a criminal justice system in which criminal statistics serves as a critical source of knowledge for decision making. The policies made by the Johnson administration brought about fundamental changes in America's criminal justice institutions. For example, the National Criminal Victimization Survey (NCVS), which is the major official crime survey of the United States, was initiated by policies made in this era. My analysis shows how the official crime statistics was understood by the American state as valuable sources of criminological knowledge which is indispensible to its engagements in crime control.

CRIMINOLOGY, GOVERNMENTALITY, BIOPOLITICS

Origins of criminology are usually traced back to two eighteenth-century thinkers' work: Cesare Beccaria and Jeremy Bentham (Jeffery 1959). For example, Foucault (1977) analyzes Bentham's design of the Panopiticon—a kind of prison that enables guards to keep a constant eye on every single inmate in the building. Moreover, criminology is a body of knowledge that "regarded by Foucault as a science of individual differences which developed in the context of the nineteenth-century prison and its disciplinary practices" (Garland 1992:404). As a "science of humans," criminological knowledge is "extremely close to the disciplinary power that shaped it" (Foucault 1977:226, quoted from Garland 1992:404). The formation of the field of criminology was

originally intertwined with the construction and functioning of a criminal justice system. In other words, from Foucault's perspective, criminology is practically orientated towards crime control. As Garland (1992:404) argues:

> According to Foucault, these new 'criminological' ways of representing delinquency and intervening normalize delinquents have come to form the rationality which underpins the modern prison system. Over the last two centuries, criticisms of the prison have been answered by measures which reproduce this way of thinking and acting, so that the process of prison reform has tended to be a repetitive one, offering up more of the same rather than dismantling the institution. In effect, criminology forms part of an unquestioned rationality which keeps the prison in place, despite its manifest failings. Criminology is thus viewed as a 'technology of the soul', a normalizing discourse which emerged out of the prison and which now feeds back into the disciplinary process of modern penality, endlessly repeating itself in order to sustain the power mechanisms which it supports. It represents itself as a 'learned discourse' but in reality it learns nothing. Instead it is instrumental, utilitarian, an adjunct of control. Its apparent humanism, like that of the modern prison, is better understood as a new and more intimate way of knowing and controlling individuals. In the 'criminological labyrinth' ('from which', Foucault adds, 'we have certainly not yet emerged') the search for explanation is in fact the pursuit of power, in which the identification of any determining cause 'marks the author of the offence with a criminality all the more formidable and demands penitentiary measures that are all the more strict' (Foucault 1977:252).

Foucault's work has inspired scholars to examine criminology within the framework of

power-knowledge relations (De Lint 2006; Garland 1985, 1992, 1997; Hogg 1998; Pasquino 1991; Pfohl 2017).[20] This scholarship digs into the genealogy of criminological knowledge, highlighting its complex philosophical, ideological, and institutional origins. Pasquino (1991:239) points out that Bentham's utilitarian philosophy perceives crime as a consequence of "calculus of pleasures and pains." To reduce crime, harsh punishment was argued to be a necessarily effective measure. This perspective embodies the classical criminological theory of penal justice, which is "constructed around a triangle formed by law, crime and punishment" (Pasquino 1991:239). In the nineteenth century, positivist criminological sciences emerged, which put emphasis on exploring what causes crime (Pfohl 2017). "Criminal" behaviors were treated and constructed as socially as well as psychologically abnormal, which is one of the core assumptions of the positivist science of criminology (Garland 1985:85). As Foucault notes, "The task of this new knowledge is to define the act 'scientifically' qua offence and above all the individual qua delinquent" (Foucault 1977:254).

In Foucault's and Foucauldians' works on criminological knowledge, governmentality is a concept encapsulated in their theoretical arguments, which mainly refers to the "problematics of government" (Foucault 1991; Rose and Miller 1992). The theory of governmentality is the argument that effective government requires both political rationalities and techniques of power. Although the role of the state apparatus in government is critical, for Foucault and subsequent authors, a more fundamental question is about the "governmentalization" of the state, rather than the state machine per se (Foucault 1991). This means that the analytical focus should be on different modalities of government. Therefore, to investigate governmentality, one needs to look beyond the state and examine how different forms of power operate and diffuse in an array of

[20] Delineating the history of criminology is beyond the scope of this article. For a brief history, see Jeffery (1959) and Cullen et al (2011). For historical texts of criminological thinking, see DiCristina (2012).

social domains (Rose and Miller 1992). In other words, to study governmentality is to explore a variety of power-knowledge regimes that deploy powers and thereby facilitate social control. Sex and punishment are two exemplary domains of governmentality that Foucault delved into. (Foucault 1977, 1978).

Further, the concept of governmentality is organically related to Foucault's another well-known concept: biopolitics. If studies of governmentality are focused on political rationalities and technologies of power, then the notion biopolitcs points to the subjects constructed and targeted by governmentality. According to Foucault (1978:139), these subjects are twofold:

> One of these poles-the first to be formed, it seems--centered on the body as a machine: its disciplining, the optimization of its capabilities, the extortion of its forces, the parallel increase of its usefulness and its docility, its integration into systems of efficient and economic controls, all this was ensured by the procedures of power that characterized the disciplines: an anatomo-politics of the human body. The second, formed somewhat later, focused on the species body, the body imbued with the mechanics of life and serving as the basis of the biological processes: propagation, births and mortality, the level of health, life expectancy and longevity, with all the conditions that can cause these to vary. Their supervision was effected through an entire series of interventions and regulatory controls: a biopolitics of the population. The disciplines of the body and the regulations of the population constituted the two poles around which the organization of power over life was deployed.

The discipline of bodies and regulations of populations lie at the center of biopolitics. Again, Foucault's analyses of histories of punishment and sexuality illustrate how bioplitics is operated, unfolded, and enacted. Take sexuality for example (Foucault 1978). Sexuality is a knowledge-

power regime, or simply governmentality, that has profound impact on not only human bodies but also the population as a whole. This embodies a set of expectations of sexuality, disciplines sexual desires and behaviors, and reproduces sexual as well as social relations. Moreover, it shapes people's views of what is sexually normal and abnormal, thereby creating social hierarchy in general and sexual majorities and minorities in particular. As a result, the entire population is socialized into a particular type of distribution of sexuality. This biopolitical process is only made possible by imposing political rationalities and using relevant technologies. In short, biopolitics and governmentality are two sides of a coin that resonates the theoretical concern with power-knowledge dialectics.

CRIMINAL STATISTICS AND THE STATE

But whereas scholars have critically examined the power-knowledge complex of criminological knowledge, this literature, except for Delem (1997), has paid no attention to criminal statistics.[21] This neglect is surprisingly problematic because criminal statistics have played a crucial role in the field of criminology. The construction of administrative and correctional criminological knowledge relies heavily on the use of criminal statistics (Hester and Eglin 2017). Even for left realist criminologists, the collection of criminal statistics is necessarily useful for explaining crime (Hough 2014; Young, Stenson, and Cowell 1991).

More broadly, the Foucauldian approach to criminological knowledge also to a great extent ignores the role of the state. This may explain why this literature overlooks criminal statistics because the state is the only organization that has sufficient resources and the authority to engage in investigating crimes and relevant activities, which lays the groundwork for the construction of

[21] For example, Garland (1992:407) states that Foucaut's analysis "gives no place to the statistical and sociological writings of the nineteenth century." Also see Garland (1992) for a comprehensive criticism of Foucault's studies of criminology.

administrative criminological knowledge and the functioning of a criminal justice system. In other words, the production of crime statistics is monopolized by the state government.

Most important, there is a major theoretical flaw in the Foucauldian approach to political power: it assumes that the exercise of political power is always de-centralized. This assumption is clearly reflected in Foucauldians' theoretical formulations (Rose and Miller 1992:174):

> Political power is exercised today through a profusion of shifting alliances between diverse authorities in projects to govern a multitude of facets of economic activity, social life and individual conduct. Power is not so much a matter of imposing constraints upon citizens as of 'making up' citizens capable of bearing a kind of regulated freedom. Personal autonomy is not the antithesis of political power, but a key term in its exercise, the more so because most individuals are not merely the subjects of power but play a part in its operations.

While this statement highlights mechanisms through which political power is exercised and diffused, overlooking power's centralized characteristic renders this argument unnecessarily flawed. It is true that the state-centered approach to political power overemphasizes the dominant role of the state, but it is also a legitimate criticism that the Foucauldian approach strikingly loses sight of the state. Nonetheless, it should be noted that although its attention to the microphysics of power has improved our understanding of power-knowledge dialectics, Foucault himself never attempts to downplay the role of the state in the dynamics of power deployments. As Jessop (2010) states:

> Foucault still argued for the dispersion of powers, insisted that the state, for all its omnipotence, does not occupy the whole field of power relations, and claimed that the state can only operate on the basis of other, already existing power relations. Yet he also conceded that the State invests and colonizes these other power relations in a conditioning-

> conditioned relationship to generate a kind of 'meta-power' that renders its own functioning possible (ibidem [Foucault 1978]: 122-3). Indeed, 'power relations have been progressively governmentalized, that is to say, elaborated, rationalized, and centralized in the form of, or under the auspices of, state institutions' (ibidem [Foucault 1978]: 345). This explains why Barret-Kriegel could note that 'Foucault's thought opened the way to a return to the study of the State and the law' (1992:192).

One hardly can have a whole picture of governmentality without attending to the role of the state in the dynamics of power relations. Indeed, the state is "governmentalized." But if the exercise and deployment of power is inevitably related to the state, then it is necessary to address the theoretical link between criminal statistics and political power. This means that a better understanding of the power-knowledge dynamics of criminal statistics requires a conceptual reformulation of the relationship between gathering criminal statistics as a form of governmentality and the state as a major power holder.

STATISTICAL GOVERNMENTALITY AND STATE POWER

Refocusing attention on the role of the state in collecting criminal statistics is a first and foremost step. But the question of how collecting criminal statistics as a form of governmentality is linked to the exercise of state power deserves further elaboration. To do so, it is analytically useful to think of collecting criminal statistics as one of practices of statistical governmentality because, more broadly, as Foucault (2009:141) notes, statistics, originally a science of the state, "enables the specific phenomena of population to be quantified." Crime statistics empirically represent a quantified form of criminality. In this regard, a fundamental question underlying this claim is

about the relationship between statistical governmentality and state power.

Within the Foucaudian framework, it can be argued that the exercise of disciplinary power and biopower is endogenous to statistical governmentality. On one hand, disciplinary power is a power that produces the docile body, a body which is "subjected, used, transformed and improved" (Foucault 1977:136). For instance, Foucault argues that the culprit—a form of docile body—is constructed by a series of judicial acts, especially punishment, and "adjacent, detective, medical, and psychological techniques" that "fall within the domain of surveillance, diagnosis, and the possible transformation of individuals" (Foucault 2009:20). On the other hand, biopower is a power that regulates a population. It is deployed by mechanisms "through which the basic biological features of the human species became the object of a political strategy" (Foucault 2009:1). For example, to control a population, a government typically employs a variety of technologies of biopower, such as actuarial science and census taking (Hacking 1991).

Statistics serves as one of the technologies of disciplinary power and biopower. Foucault (2009:411) states that a government "needs to know the population, the army, the natural resources, the production, the commerce, and the monetary circulation – all the elements that are in fact provided by the science, or domain of knowledge, statistics." Statistical knowledge provides a government with information about the population it governs, thereby empowering it to impose political and social order on the society. As a technology of power, statistics also helps to create norms by presenting what is normal or abnormal, what is the majority or minority, and what is more likely or less likely to occur. Simply put, statistical laws become laws of society (Hacking 1990). In this sense, statistics becomes a necessary technology of disciplinary power and biopower.

If statistical governmentality is to aim at facilitating the deployment of disciplinary power

and biopower, then what role does the state play? For scholars of governmentality, powers that shape social life are beyond the state and dispersed throughout a variety of social domains, forming a decentralized network of government (Rose and Miller 1992). However, disciplinary power and biopower are hardly independent of the state because it will ultimately be "consolidated into the territorially based, institutionally structured order of the modern state" (Mitchell 1999). This means that disciplinary power and biopower are better to be seen as a variant of, rather than being incompatible with, state power. Furthermore, collecting official statistics is essentially a technology of state power. As Bourdieu (2015:214) argues:

> Statistics make it possible to totalize information from individuals and obtain from this, by totalization, information that none of the individuals who provided the basic information have. Statistics is precisely a transcendent technique that makes it possible to effect a totalization (everything I am saying about the state holds good also for statistics), but it is not easy to have the means to "raise" information.

According to Bourdieu (1994:4), the state is "the culmination of a process of concentration of different species of capital," including the capital of physical force, economic capital, symbolic capital, and informational capital. Among these forms of capital, information capital is of paramount importance in terms of the state being a "theory unifier" (Bourdieu 2015) because it "concentrates, treats, and redistributes information most of all, effects a theoretical unification" (Bourdieu 1994:7). Notably, gathering official statistics is one of the ways in which the state is capable of accumulating its information capital. In short, official statistics serve as totalized information for the state, thereby making the collection of statistics a "typical state act" (Bourdieu 2015:141–42).

More importantly, the goal of the state's efforts to accumulate informational capital is to

exercise it symbolic power—the power of world-making (Bourdieu 1989b:22). Symbolic power is a form of state power that creates social categories, groups, and classes. By virtue of collating official statistics, the state is able to impose its synoptic view of society on the population, making a social world on the basis of its grammar of categorization (Scott 1999). Symbolic power, therefore, cannot be successfully exercised without the information capital that the state holds. In other words, its exercise is dependent upon the state's informational capacity.

In summary, statistical governmentality is thus theoretically internal to state power. Specifically, three forms of state power are deployed through collecting official statistics: symbolic power, biopower, and disciplinary power. Statistics is not only a political rationality but also a political technology that helps discipline bodies, regulate the population, and, ultimately, create a society that represents the ideal of the state.

COLLECTING CRIMINAL STATISTICS AS A TECHNOLGY OF STATE POWERS

State power, as articulated above, is inextricably linked to the biopolitics of statistical governmentality. On the basis of this theoretical formulation, I argue that collecting criminal statistics serves as a technology of state powers—namely symbolic power, biopower, and disciplinary power. To gain crime control over its population, the state tends to depend on statistical knowledge about crime to develop policies on criminal justice.[22]

Further, I identify three mechanisms by which official criminal statistics are gathered to empower the state to intervene in the crime control over a population: criminological construction, quantification, and normalization. First, criminological construction refers to a series of action taken by the state to create symbolic space wherein problems of crime can be

[22] My argument also echoes, but slightly differs from, Foucault's (2009:23) perspective that gathering criminal statistics is a technology of security.

defined, criminal behaviors can be classified, and discourses on criminal justice can be developed. This process results in the creation of symbolic violence and misrecognition, through which a variety of "crimes" are reified by and inscribed in official criminal statistics. Successful construction requires the exercise of the state's symbolic power.

Second, criminological supervision is a socio-technical process by which criminal activities are transformed into statistical numbers. It entails simplifying complex social life and aggregating individual behavior, thereby providing the state with a synoptic view of criminality (cf. Scott 1999). In other words, the population is kept under informational and criminal surveillance by the state's gathering of criminal statistics. This surveillance is made possible by the state's exercise of its biopower.

Third, criminological intervention is a regulatory process of crime control and in which crime statistics serve as a basis for providing the state with information about the correctional component of its criminal justice system, such as prosecution, sentencing, penalties, and probation. More broadly, this criminological regime of knowledge is also used for administering the state's criminal justice system, including police and law enforcement, courts, and correctional agencies. To intervene in the production of docile bodies, the state must exercise its disciplinary power.

To summarize, criminological construction, supervision, and intervention are three major mechanisms by which the state collects criminal statistics to facilitate its crime control. Criminological construction requires the state's symbolic power. Criminological quantification is made possible by the exercise of the state's biopower. Criminological intervention results from the fact that the state wields disciplinary power (see Table 1 for summary).

(Table 1 about here)

THE CRIMNIOLOGICAL STATE: THE AMERICAN CASE

To show the usefulness of the theory outlined above, this article examined the American state's policy decision on the nationwide, systematic gathering of statistical data on crime. While the Bureau of Justice Statistics (BJS) was established in 1979 and has been responsible for collating crime statistics since then, national criminal statistics started to be routinely collected in 1972 when the National Crime Survey (NCS)—the predecessor of the National Crime Victimization Survey (NCVS)—was implemented by the federal government. Thus, it is important to know why the American state decided to do so, how it interpreted its motivations for the policies, and in what ways it justified the decisions. Through analysis of official discourses about the use of criminal statistics, I seek to understand the political rationalities of collecting criminal statistics as a technology of state powers. It should be noted that the analysis that follows is neither a comprehensive case study nor a historical account of particular criminal justice policies or institutions. Either of these attempts is beyond the scope of this article.

A Brief History of Collecting Criminal Statistics in the United State

In the United States, New York is the first state that collected crime statistics, which began in 1829. Twenty five states had followed suit up until 1911. This increasing practice of crime data collection was also affected by European predecessors (Deflem 1997). The local official data on crime were gathered by state officials based on reports submitted by the states' attorneys or courts (Robinson 1933). National judicial criminal statistics were first collected along with the 1850 census. Since then, the Census Bureau had continued to compile official statistics on crime primarily from courts. In 1926, the Children's Bureau started to collect statistics on juvenile

delinquency (Robinson 1933).

In addition to the federal and local governments and law enforcement agencies, social scientists were also engaged in the collection of criminal data. In the first two decades of the twentieth century, jurists worked with certain social scientists and statisticians, who were affiliated with the American Institute of Criminal Law and Criminology, to established a Committee on Criminal Statistics (Ghatak 2008). In 1929, the Social Science Research Council (SSRC) and the Committee on Uniform Crime Records of the International Association of Chiefs of Police (IACP) published a report titled *Uniform Crime Reporting*. This report consists of criminal statistics derived from reports issued by law enforcement agencies (Robinson 1933). In 1930, the Uniform Crime Reporting system (UCR) was established. Based on police reports, it was the most important institutional effort made for the collection of criminal statistics in the first half of the twentieth century (Rosen 1995).

There were also attempt to conduct surveys to collect crime data. In 1929, the National Commission on Law Observance and Enforcement was established by President Herbert Hoover. The Commission worked with Harvard professor Samuel Bass Warner, a member of the Committee of Criminal Statistics of the American Institute of Criminal Law and Criminology, to design criminal surveys. Warner "suggested that the task of collection of criminal statistics should not be entrusted to an agency that is directly involved with law enforcement in order to ensure objectivity and scientific credibility of the data" (Ghatak 2008:41). The police also championed the idea of creating a government agency responsible for collecting criminal statistics. For instance, Lawrence Dunham, former Deputy Commissioner of the New York Police Department, supported the creation of a national institution of criminal statistics because such agency "could prove to be an excellent bridge between the practical and theoretical

dimensions of criminology" (Ghatak 2008:39).

However, the ideas of conducting national surveys on crime and creating a government agency in charge of collecting criminal statistics were not able to be institutionally implemented until the late 1960s. On July 23, 1965, Presdient Lyndon Johnson established the President's Commission on Law Enforcement and Administration of Justice. In 1967, the Commission published its report, *The Challenge of Crime in a Free Society*. In 1968, a related governmental agency—Law Enforcement Assistance Administration (LEAA) was formed within the Department of Justice following the Omnibus Crime Control and Safe Streets Act of 1968, which was signed by President Johnson (United States Congress 1968). Title I of the Act states that the LEAA is to "encourage States and units of general local government to prepare and adopt" relevant law enforcement plans, to "authorize grants to States and units of local government in order to improve and strengthen law enforcement," and, most importantly, to "encourage research and development directed toward the improvement of law enforcement and the development of new methods for the prevention and reduction of crime and the detection and apprehension of criminals" (United States Congress 1968). Notably, because the LEAA was responsible for collecting data on crimes, in 1972, it initiated the National Crime Survey (NCS), which was supervised by an agency in the LEAA: National Criminal Justice Information and Statistics Service (NCJISS) (Lynch and Addington 2006; Penick and Owens III 1976). The Act also required other government agencies that were in charge of collecting official statistics, such as the Census Bureau, to cooperate with the LEAA to "to supply such statistics, data, program reports, and other material as the Administration deems necessary to carry out its functions" (United States Congress 1968). As noted in an internal memo of the LEAA, the objective of the NCS is to "provide a reliable statistical series on the amount of dangerous crime in the United

States and the rate of victim experience" (Penick and Owens III 1976:220).

Before the implementation of the NCS in 1972, the Commission contracted the National Opinion Research Center (NORC) to conduct pilot studies in Boston, Chicago, and Washington, D.C. Then the Commission recommended implementing a regular national crime survey. This recommendation was accepted by the LEAA, which led towards the creation of the NCS. In the beginning, the NCS consists of several sub-surveys: the Crime Panel, the Central City Panel Survey, and the Commercial Victimization Surveys. The Crime Panel is the only survey that continued after 1976 (Lynch and Addington 2006). In 1979, the Bureau of Justice Statistics (BJS) was established by the Justice Systems Improvement Act of 1979. In 1986, the BJS was in charge of redesigning the NCS based on the recommendations made by the National Academy of Science's (NAS) research on it (Penick and Owens III 1976). In 1992, the NCS was renamed National Crime Victimization Survey (NCVS) with other substantial, technological, and methodological changes suggested by research teams (Powers and Leili 2017).

Criminological Construction and Symbolic Power: Criminal Statistics for Defining a "Problem of Crime"

The establishment of the Commission on Law Enforcement and Administration of Justice was at the core of President Johnson's "war on crime," one of his signature, however notoriously controversial, policies (Hinton 2017; Simon 2009). This "war" was symbolized in the political action taken by the Johnson administration to call for "law and order," which was seen as complementary to its "Great Society" programs. To create an image in which the problem of crime is so legitimately urgent that the government needs to immediately tackle it, on March 9, Johnson (1965) wrote to Congress:

> Crime—the fact of crime and the fear of crime—marks the life of every American. We know its unrelenting pace: a forcible rape every 26 minutes, a robbery every five minutes, an aggravated assault every three minutes, a car theft every minute, a burglary every 28 seconds. We know its cost in dollars—some $27 billion annually. We know the cost it inflicts on thousands—in death, injury, suffering and anguish. We know the still more widespread cost it exacts from millions in fear: Fear that can turn us into a nation of captives imprisoned nightly behind chained doors, double locks, barred windows. Fear that can make us afraid to walk city streets by night or public parks by day. These are costs a truly free people cannot tolerate.

In this special message to legislators, a variety of crimes ("rape", "robbery", "aggravates assault", "car theft", and "burglary") are concretized in statistical term ("every 26 minutes", "every three minutes", and "every 28 seconds"). This marriage of criminal categories and statistical numbers reifies the occurrence of criminal activities, constructing a picture that crimes happen "very frequently." Moreover, this image is linked to financial, physical, and psychological consequences ("We know its cost in dollars" and "We know the cost it inflicts on thousands—in death, injury, suffering and anguish"). By concluding that "[t]hese are costs a truly free people cannot tolerate," Johnson's rhetoric appealed to the rational calculation of cost-benefit analysis, which is another component of the grammar of statistical language (cf. Porter 1996a). The purpose of it was to convince Congress that the problem of crime is too costly to ignore. In so doing, the crime problem was able to be successfully constructed.

Since a problem had been identified, the government ought to offer its policy responses. Johnson's Commission, thus, in its report *The Challenge of Crime in a Free Society*, proposed to systematically collect official statistics on crime:

> One essential requirement for research is more complete information about the operation of the criminal problems. To meet this requirement, the Commission recommends the creation of a National Criminal Justice Statistics Center. The Center's first responsibility would be to work with the FBI, the Children's Bureau, the Federal Bureau of Prisons, and other agency to develop an integrated picture of the number of crimes reported to police, the number of persons arrested, the number of accused persons prosecuted, the number of offenders placed on probation, in prison, and subsequently on parole (President's Commission on Law Enforcement 1967b:x).[23]

The key suggestion—the establishment of a National Criminal Justice Statistics—was also made in the Commission's another report, *Crime and Its Impact—An Assessment* (President's Commission on Law Enforcement 1967a). The report states that the establishment of national criminal statistical program is needed in order to

> (1). Inform the public and responsible governmental officials as to the nature of the crime problem, its magnitude, and its trend over time. (2). Measure the effects of prevention and deterrence programs, ranging from community action to police patrol. (3). Find out who commits crimes, by age, sex, family status, income, ethnic and residential background, and other social attributes in order to find the proper focus of crime prevention programs. (4). Measure the workload and effectiveness of the police, the courts, and the other agencies of the criminal justice system, both

[23] More Specifically, the Commission specified that the Center "should be responsible for the collection, analysis, and dissemination of two basic kinds of data: Those characterizing criminal careers, derived from carefully drawn samples of anonymous offenders. Those on crime and the system's response to it, as reported by the criminal justice agencies at all levels. In addition, the Center would serve as a central focus for other statistics related to the crime problem, such as costs of crime, census data, and victim surveys. It would have to work in close coordination with the FBI's Uniform Crime Reports Section, the Children's Bureau of the Department of Health, Education, and Welfare, the Federal Bureau of Prisons, and other existing agencies 'with continuing responsibility for collecting and reporting related statistics. It would combine their information into an integrated picture of crime and criminal justice" (President's Commission on Law Enforcement 1967b:269).

> individually and as an integrated system. (5). Analyze the factors contributing to success and failure of probation, parole, and other correctional alternatives for various kinds of offenders. (6). Provide criminal justice agencies with comparative norms of performance. (7). Furnish baseline data for research. (8). Compute the costs of crime in terms of economic injury inflicted upon communities and individuals, as well as assess the direct public expenditures by criminal justice agencies. (9). Project expected crime rates and their consequences into the future for more enlightened government planning. (10). Assess the societal and other causes of crime and develop theories of criminal behavior.

This suggestion demonstrates that the Johnson administration attempted to keep an eye on the problem of crime by gathering statistical data. Although the BJS was not formed until 1979, the establishment of the LEAA in 1968 and the NCS in 1972 was the *de facto* implementation of the idea. This action represents the state's efforts to monopolize the discourse about the crime problem. Because the construction of a political problem requires authoritative materials to substantiate the claims made by government officials, official criminal statistics are scientific evidence that can be used to justify the Johnson administration's policy on crime justice.

In addition to providing evidence of the existent, or suggestions for improvement of, the crime problem, criminal statistics were also deemed to be part of the state's wider project of creating a "Great Society." The Commission recommended the National Criminal Justice Statistics Center to collaborate with other government agencies to integrate and analyze statistical data on crime. This idea was put into practice by establishing the LEAA within the Department of Justice and its later collaboration with the Census Bureau.

Overall, the efforts made by the Johnson Administration to systematically and routinely keep criminal statistics are aimed at facilitating the exercise the American state's symbolic power in order to wage a "war on crime." To fight this war, the government must construct a problem of

crime and craft a criminological discourse about the urgency of the problem. Criminal statistics, therefore, serve as useful symbolic weapons. Statistical data on crime create symbolic space in which crime problems can be defined, crimes can be categorized and reified, and potential policy solutions can be justified.

Criminological Supervision and Biopower: Crime Statistics for Keeping the Population under Criminal Surveillance

Once the problem of crime was constructed, the government needed to formulate policies towards solving the problem. To formulate effective policies, legislators depended heavily on research on relevant issues. The most fundamental as well as difficult question was about causes of crime. As the Committee noted:

> The causes of crime, then, are numerous and mysterious and intertwined. Even to begin to understand them, one must gather statistics about the amounts and trends of crime, estimate the costs of crime, study the conditions of life where crime thrives, identify criminals and the victims of crime, survey the public's attitudes toward crime. No one way of describing crime describes it well enough (President's Commission on Law Enforcement 1967b:18).

Criminal statistical data were perceived as necessary for explaining origins of crime. In other words, the quantification of crime was seen by the Commission as an instrument which could enhance the understanding of the crime problem. In this regard, the understanding of crime is based on the numerical, quantified representations about crime. Crime was operationalized as matrices of quantities. Indeed, the Commission clearly expressed its opinion about the quantification of crime:

> What is known about the trend of crime in the total number of offenses; in the ratio of offenses to population, which measures roughly the risk of victimization; and in the relationship of crime trends to changes in the composition of the population, which measures roughly the crime proneness of various kinds of people almost wholly a product of statistics. Therefore the Commission has taken a particularly hard look at the current sources of statistical knowledge (President's Commission on Law Enforcement 1967b:25).

For the Johnson administration, the ultimate objective of quantifying crime was to keep the population under criminal surveillance. The quantification of crime of the population, thus, served as criminological knowledge for criminal justice policymaking. For policymakers, identifying causes of crime must have a purpose. On the basis of this belief, statistical analysis of data on crime lays the groundwork for formulate effective policies on criminal justice:

> The techniques of analysis can be brought to bear only on those parts of crime and criminal justice that are amenable to quantification, and these measurable values must always be considered in relation to what are frequently more important, often unquantifiable values in making any decisions about modification of police, court, or corrections operations. The cost-effectiveness approach does not force a quantification of unmeasurable human values. Rather, it sets out those implications that are quantifiable, and thereby permits a sharper focus on the critical questions of social policy by the legislator and the administrator (President's Commission on Law Enforcement 1967b:262).

Moreover, statistical techniques of quantification were also perceived as a measure of further dealing with the problem of identification of "criminals." For the police, collecting physical evidence, such as, most notably, fingerprints, at crime scenes was suggested by the Commission to be important because "it might help greatly to establish a case for or against a

suspect" (President's Commission on Law Enforcement 1967b:118). This approach to identifying "criminals" was based on biological characteristics of the population. To recognize physical evidence, the state must establish a database that includes as many data as possible, and statistical technology was the only approach that could be deployed to analyze the data. The Commission clearly recommended:

> The classification study should develop statistical data on the information contained in fingerprints (e.g., the variations in ridge counts from core to delta for ulnar loops) and ultimately should establish a search procedure based on these data. The utility study should be conducted for the purpose of estimating how many more arrests a few selected law enforcement agencies might have made if they had had a latent fingerprint capability. If an effective procedure is developed and its utility demonstrated, these studies should be followed by an equipment development program (President's Commission on Law Enforcement 1967b:155).

The attempts to systematically quantify biological traits of the population in order to facilitate criminal surveillance represent the biopolitics of crime. Physical characteristics were meant to be used in statistical data analysis of the identification of criminals. They were also meant to be statistically collected to keep track on the population. In this regard, criminality was statistically quantifiable.

In short, the American state tended to exercise biopower by transforming criminality into statistics and keeping the population under criminal surveillance. The purpose was to construct knowledge about causes of crime so that the government was able to formulate policies that were effective for tackling the crime problem. This statistics-based criminological knowledge also serves as a tool of crime surveillance by gathering statistics on biological characteristics of the

American population. Criminal statistics, therefore, enable the state's criminal justice system to be the only legitimate force engaged in crime control.

Criminological Intervention and Disciplinary Power: Criminal Statistics for Penalizing Criminals

If the war on crime defined a social problem so that the state could legitimately keep the population under criminal surveillance, then state intervention came to be desirable in terms of solving the problem. What role does collecting criminal statistics play in terms of the exercise of the state's disciplinary and penal power? In 1975, the LEAA organized the National Advisory Committee on Criminal Justice Standards and Goals to conduct research on topics regarding crime and criminal justice. In one of the Committee's reports (1976), *Organized Crime: Report of the Task Force on Organized Crime*, while discussing organized crime and its relationship with the correctional institutions, the Committee stated:

The use of civil remedies against organized crime figures also has proven to be a successful prosecution tool. But what type of cooperation between a State's regulatory and law enforcement agencies assures that success? What preventive measures can a State's regulatory agencies take, for example, in licensing certain public activities? Does withholding of business licenses after investigation control organized crime in a particular jurisdiction? Only by maintaining regular statistics can these questions be answered (National Advisory Committee on Criminal Justice Standards 1976:73)

The Advisory Committee perceived of criminal statistics as a necessarily effective instrument of facilitating prosecution and regulation. Similarly, criminal statistics were seen as being able to help make assessments of the efficacy of correctional measures. For example,

President Johnson's Commission claimed:

> With sufficient effort, an adequately, complete and detailed model could be developed from the rudimentary, generalized model shown in figure 6. It would permit examination of such questions as: The effects upon court and correctional caseloads and operating costs of a 10 percent increase in police clearance rates. The effects upon court and correctional cost and workloads of providing counsel to all those arrested. The effects upon costs and arrest rates in a particular state of instituting a given community treatment program for certain sentenced offenders. The projected workloads and operating costs of police, courts, and corrections for the next 5 years. The effects upon recidivism and associated costs of statistical techniques that permit sentencing judges to prescribe optimum treatment programs (President's Commission on Law Enforcement 1967b:263).

More specifically, the Commission suggested that criminal statistics should be applied to evaluating what "treatments" are best for what "kinds of offenders":

> Sentencing and correctional decisions-providing more complete history of an offender and his reactions to prior correctional actions; statistical estimates of the effects of different kinds of treatment on different kinds of offenders (President's Commission on Law Enforcement 1967b:266).

This line of thinking shows that the government tended to use statistics to make "decisions about treatment of convicted criminals" (President's Commission on Law Enforcement 1967b:246). The use of criminal statistics, thus, was thought of as valuable for law enforcement and correctional agencies to make their decisions about prosecution, sentencing, or probation. In other words, criminal statistics serve as a form of criminological knowledge that offers guidance about the delivery of criminal justice. President Johnson's Commission made clear

recommendations on how statistics is capable of improving measures of corrections and rehabilitation:

> The Commission recommends: Statistical aids for helping in sentencing and selection of proper treatment of individuals under correctional supervision should be developed. In addition to assisting in treatment selection, statistical techniques of experiment design must play an important role in correctional program development, testing, evaluation, and planning. Of all the behavioral areas, offender rehabilitation offers perhaps the best opportunity for reasonably careful experimental control to determine the effects of actions taken. There should be an expanded use of careful, controlled evaluation in the development of correctional programs. Program development should be preceded by careful studies of the specific correctional objectives, and testing should be conducted by personnel qualified in the behavioral sciences and in statistical analysis (President's Commission on Law Enforcement 1967b:260).

To summarize, the use of criminal statistics in corrections represents how statistical techniques can be applied to facilitating the deployment of the American state's disciplinary power. Criminal statistics provide the government with knowledge about how "criminals" are and should be treated, such as prosecution, sentencing, incarceration, and rehabilitation. To effectively exercise its disciplinary power, the state requires scientific criminological knowledge in the form of statistics so that cause-and-effect correlations can be found. Consequently, this form of criminological knowledge—criminal statistics—empowers state authorities to make decisions on corrections, discipline, and penalties.

DISCUSSION AND CONCLUSION

The Johnson administration's "war on crime" created symbolic space in which the crime problem was constructed by citing criminal statistics. To solve the problem, it decided to institutionalize the systematic collection of national criminal statistics. It also attempted to use criminal statistics to help give correctional treatment to criminals. These political rationalities underlying the government's policymaking processes demonstrate how the American state employs the collection of criminal statistics to facilitate its exercise of symbolic power, biopower, and disciplinary power. The American state perceives statistical data on crime as practically indispensible to the functioning of its criminal justice system because the knowledge built on criminal statistics is capable of helping it to construct the problem of crime, supervise the criminal activities, and intervene in corrections.

Understanding relationship between criminal statistics and state power helps better understand criminal justice systems. For example, in the United States, the criminal justice institutions have been criticized for the rapid rise of mass incarceration (e.g., Alexander 2012). Based on this article's analysis, mass incarceration is better to be thought of as a result to which the American state's exercise of symbolic power, biopower, and disciplinary power leads, in which statistical criminological knowledge plays a vital role. This means that it is necessary to complicate, rather than simplify, the phenomenon. If mass incarceration is rooted in the process by which the massive network of statistics-based criminological knowledge and expertise, state bureaucrats, and political power forms, then to improve the current situation may need to have a plan to reform the entire U.S. criminal justice system.

More broadly, this article also has implications for studies on the governmentality and biopolitics of social control (cf. Cohen 1991; Garland 2002). As discussed earlier, the Foucaudian approach is flawed if the role of the state is ignored. While understanding the micro-

physics of power-knowledge dynamics is important, one can hardly have a full account of the biopolitcs of the governmentality without tracing the state's rationalities of the use of technology of political power (e.g., criminal statistics). The state's interpretations and justification of the technologies of power it employes also can help understand the ways in which power is deployed in social life. Furthermore, attention to relationship between the biopolitics of statistical governmentality and state power can broaden the range of empirical investigation. For example, in the case of research on criminal justice, attention to criminal statistics sheds a new light on this topic.

Finally, this study contributes to theory of the state. Research on the state has shifted attention to the cultural dimension of modern state building (e.g., Loveman 2005; Mayrl and Quinn 2016; Mitchell 1991; Steinmetz 1999), but less attention has been given to the role of social knowledge (Rueschemeyer and Skocpol 1995). My investigation of the power-knowledge relations of the state's collection of criminal statistics—the formation of a criminological state—draws attention to the implicit symbolic struggles that happen in the state's political action. This focus highlights the importance of social scientific knowledge to the consolidation of state power, and lays the groundwork for future research on the multi-faceted, omnipresent state.

Table 1: Theoretical Framework of the Criminological State

State Action	Technology of Power	State Power	Mechanism
Criminological Construction	Collecting Criminal Statistics	Symbolic Power	Creating symbolic space wherein problems of crime can be defined, criminal behaviors can be classified, and discourses on criminal justice can be developed
Criminological Supervision	Collecting Criminal Statistics	Biopower	Providing the state with a synoptic view of criminality and keeping the population under criminal surveillance
Criminological Intervention	Collecting Criminal Statistics	Disciplinary Power	Offering the state information about the correctional component of its criminal justice system, such as prosecution, sentencing, penalties, and probation

CHAPTER 4

Why Does the Public Talk Back?
The Politics of Skepticism about Opinion Polling in the United States

Polling is merely an instrument for gauging public opinion. When a president or any other leader pays attention to poll results, he is, in effect, paying attention to the views of the people.

—George Gallup, Founder of the Gallup Poll[24]

America, let us tonight go forth and reject the politics of division. Let us defeat the Clinton machine. Let's send the consultants, the pollsters, and the lobbyists packing. Let's give the power back to the people! And let's elect Donald Trump President of the United States!

—Laura Ingraham, Conservative Radio Talk Show Host,
Republican National Convention, 2016

The same people who did the phony election polls, and were so wrong, are now doing approval rating polls. They are rigged just like before.

—Donald Trump, President of the United States,
Twitter, 2017

Introduction

Over the past five decades, American society has witnessed a proliferation of public opinion polls (Herbst 1995; Igo 2007; Wuthnow 2015). Although the great majority of Americans have been gradually accustomed to scientific polling since its inception in the 1930s (Igo 2007), negative attitudes toward it also have been increasing (Kim, Gershenson, Glaser, and T. W. Smith 2011; Schleifer 1986). Skepticism about polling—alongside a distrust of the mass media, scientific communities, and the political establishment—appeared to reach its apogee with the

[24] This quote is taken from Simon (2011:47).

victory of Donald Trump in the 2016 presidential election. Ironically, the Trump campaign's populist, anti-establishment rhetoric, such as "dishonest media" and "rigged polls," was emboldened by the polling industry and news media's failure to foresee a Trump presidency.[25] This fiasco also caused great concern among professional pollsters, occasioning the claim that there is a "crisis in polling."[26] Given that trust is indispensable for democracy in general (Gamson 1968; Hahl, Kim, and Sivan 2018; Paxton 2002; Putnam, Leonardi, and Nanetti 1994; Tarrow 2000), an increasing mistrust of opinion polling can pose a threat to American democracy.

Opinion polling, as a modern political instrument for gauging public sentiment (Bourdieu 1979; Habermas 1991; Tilly 1983), has not only been institutionalized in American politics and embedded in American democratic culture, but it also has helped develop a new political industry in which polling firms play a central role along with lobbyists, political consultancies, public relations agencies, and news media companies (Cantrell 1989, 1992; Herbst 1995; Sabato 1981). Research on the history of polling in the United States has documented how the journalistic practice of conducting straw polls in the nineteenth century evolved into a scientific enterprise of measuring public opinion in the mid-twentieth century (Fried 2011; Herbst 1995; Igo 2007; Wuthnow 2015). The scientific authority of opinion polling largely contributes to its

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[25] For example, in a post-election interview, the Trump campaign's manager, Kellyanne Conway, who was also a pollster, said: "The biggest piece of 'fake news' in this election was that Donald Trump couldn't win." (https://www.realclearpolitics.com/video/2016/12/04/kellyanne_conway_the_biggest_piece_of_fake_news_in_this_election_was_that_donald_trump_couldnt_win.html)

[26] https://www.aapor.org/Publications-Media/Press-Releases/AAPOR-to-Examine-2016-Presidential-Election-Pollin.aspx

professional status in American society and facilitates the establishment of its trustworthiness in the political domain, where disinterestedness is perceived to be one of the acceptable norm (Jasanoff 2006). Poll results, which have been fundamental to democratic politics, are expected to be a neutral, objective representation of public opinion (cf. Porter 1996a).

What causes distrust of opinion polling? While the literature on public opinion polling has called attention to the issue of trust, the American public's attitudes toward polling are often analyzed within an epistemic framework of "survey cooperation"—whether or not individual poll respondents are psychologically willing to respond to a battery of questions asked by pollsters (Kim et al. 2011; Kohut 1986; Rogelberg et al. 2001; Roper 1986; Schleifer 1986; Stocké 2006). Aiming to maintain or improve the relationship between surveyed and surveyor, this scholarship focuses on poll respondent concerns with, experiences of, and feelings about opinion polls. For example, analysts have examined if the public enjoys being polled, if it takes too long for respondents to answer polls, or if citizens think poll questions invade their privacy. Understanding whether the public holds favorable opinions about polls is crucial for pollsters in that willingness to answer polls is the livelihood of the polling industry (Kohut 1986). Underlying this practically oriented research is an assumption that public opinion on polling is mainly influenced, and even determined, by the interaction between respondents and pollsters. Nonetheless, this perspective ignores the broader social, political, and ideological contexts in which trust in and mistrust of opinion polls emerge, reproduce, and disseminate.

This article investigates the social origins of public distrust of polling by recognizing that opinion polls are inevitably linked to, and complicated by, politics (Bourdieu 1979). Drawing on research on public trust in social and political institutions, such as governments, the news media, and science, I argue that the public evaluates the credibility of opinion polling primarily through

partisan and ideological lenses. To examine these hypotheses, I analyze cross-sectional surveys conducted in the 1980s and 1990s. These surveys all contain questions that ask respondents' opinions about the credibility of opinion polls. Additionally, I leverage the General Social Survey (GSS) to analyze relationships between the American public's trust in opinion polls, the news media, and science. Finally, I discuss the findings' broader implications for democratic politics in the United States.

The Institutionalization of Public Opinion Polling in American Democratic Politics

Public opinion polling has been one of the routinized practices of contemporary American democracy. When opening newspapers, turning on televisions, or surfing on the internet, citizens are constantly receiving polling information about abortion, immigrants, same sex marriage, inequality, tax policy, the death penalty, gun control, terrorism, and a dazzling array of social and political issues. During election seasons, polls on political candidates' approval ratings are updated on a weekly or even daily basis. In addition to producing news reports, opinion polls are used by the press in making predictions about voting behavior and forecasting electoral outcomes. Opinion polls are also crucial for politicians. Poll numbers on voter support determine whether or not a candidate is allowed to participate in televised debates. And opinion polls tell politicians "which way the wind blows" so that they can set their agenda for policymaking or develop campaign strategies. Simply put, "the politicians who yesterday said 'God is on our side' today says 'public opinion is on our side'" (Bourdieu 1979:125).

This institutionalized practice dates back to the nineteenth century. In 1824, the newspaper, the *Harrisburg Pennsylvanian*, took straw polls and successfully predicted that Andrew Jackson would win the presidential election. Since then, straw polling had been a common practice

among, and widely accepted by, journalists and party workers during election seasons. Journalism relied heavily on straw polls to provide "horse race" coverage of elections and campaigns (Cantril 1991; Herbst 1995). Nonetheless, in 1936, the magazine *Literary Digest*, which had successfully predicted the outcome of every presidential race since 1920, notoriously failed to foresee that Franklin Roosevelt would be re-elected. In contrast to this failure, George Gallup, a pioneer of opinion polling as well as market research, correctly forecast the outcome. As a result, straw polls were entirely replaced with modern opinion polling, which adopts the method of scientific sampling. In about the same period, opinion polling started to detach itself from the news media industry, evolving into an autonomous profession. For instance, Gallup founded the American Institute of Public Opinion to sell opinion polls to newspapers. Although criticized for his consumption-oriented techniques, Gallup and his business became the well-known symbol of public opinion polls in the 1930s, especially after the 1936 election (Converse 2009; Igo 2007).

However, Gallup and other leading pollsters, Archibal Crossley and Elmo Roper, were embarrassed by their complete fiasco in the 1948 presidential election, in which they predicted Thomas Dewey would win with a big margin. But the result was just the opposite. After this failure, pollsters worked with social scientists to successfully re-build their professional authority (Fried 2011). Since the mid-twentieth century, both the number and scale of polling organizations, for-profit or non-profit, have steadily increased, forming an industry that is indispensable to American democracy and social life (Converse 2009; Herbst 1995). Since Jimmy Carter, it has been routine for American presidents to hire their own pollsters, not to mention political candidates who need to track polls to run their campaigns (Cantrell 1989).[27]

[27] In addition to politicians, religious groups have also engaged in the enterprise of opinion

Accompanied by the movement of precision journalism (Herbst 1995), the news media's reliance on opinion polls has increased since the 1950s (Broh 1983).[28]

Their direct relevance to elections and the adoption of scientific sampling technology are two keys to understanding the institutionalization of opinion polling in American democratic politics. First, because opinion polls are primarily used in election forecasting, the formation of a polling business is a rational response to that demand from the news media industry and the political market of election campaigning. Thus, political pollsters have symbiotic relationships with the news media, political consultants, lobbyists, and public relations firms (Cantrell 1989; Herbst 1995; Sabato 1981). Second, in addition to commercial pollsters, academics have also played a critical role in the development of polling technology. The involvement of scientists and their collaboration with commercial pollsters led toward the establishment of a new profession of opinion polling, separated from journalism (Herbst 1995). For instance, public opinion researchers as well as practitioners collectively organized the American Association for Public Opinion Research (AAPOR), which has its own professional journal and holds conferences regularly (Converse 2009). This professional, scientific authority gives legitimacy to the practice of opinion polling in democratic politics, in which objectivity and impartiality have been criteria for making decisions and judgments (Jasanoff 2009).

In summary, two fundamental characteristics enable the institutionalization of polling in American politics. First, since the nineteenth century, polls have always been valuable for the news media to report elections and predict electoral outcomes. Second, starting in the mid-twentieth century, opinion polling has been commonly perceived as a profession that possesses

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polling (Wuthnow 2015).

[28] For the idea of precision journalism, see Meyer (2002).

scientific authority. Both characteristics helped establish the legitimacy of opinion polls in the American democratic system.

Public Trust in and Distrust of Opinion Polls

Although opinion polling has been institutionalized in American politics (Cantrell 1989; Herbst 1995) and has had profound cultural impact on American society (Igo 2007), there has been no lack of skepticism about it. During the post-war era, when the profession of political polling was taking off, Americans were eager to express doubts about the purpose of polling the public. For instance, people wrote to George Gallup that "I can tell you loaded that poll so that you could give your New Deal, Communist pal Roosevelt another plug" and "Your faked poll results are part of the campaign…to vilify the good name and candidacy of a great American." For critics, polls can be manipulated to give certain candidates a better shot (Igo 2007:169–70). Moreover, other challenges were aimed at the validity and reliability of polls. For example, a skeptic once questioned another pioneer of the opinion polling profession in the 1930s—Elmo Roper: "Where do you get your information? I am 44 yrs old and have never been interviewed by a poll taker" (Igo 2007:165). Similarly, it was common to hear people complain that "Gallup never asked me" (Igo 2007:152). These reactions reflect an American public distrust of the technique of opinion polling, even though the practice was already common in mid-century America.

Professional pollsters were certainly haunted by skepticism about polling. The polling industry's debacle of the 1948 presidential election prediction forced pollsters to collaborate with social scientists to figure out what went wrong (Fried 2011). In the 1980 presidential election, the polling industry again failed to forecast a big victory of Ronald Reagan. This failure provoked widespread criticism afterwards, which then resurfaced in the 1984 election (Kohut

1986). Asking if there was a crisis of confidence in opinion polls, AAPOR organized a plenary session at its 1985 annual conference (Goyder 1986; Kohut 1986; Roper 1986; Schleifer 1986).[29] Most of these analysts mainly grappled with the questions of whether the American public had confidence in opinion polls by conducting surveys.[30] They asked a series of similar questions concerning the public's attitudes toward opinion polls, such as the length of interviews, experiences of being polled, accuracy of polls, and trustworthiness of pollsters. They found that although the majority held favorable opinions about polls and few were negative about them, more people took unfavorable views of polls in the 1980s than in the 1970s. To make respondents feel better about polling, these authors argued, there was room for the polling industry to improve the ways in which they went about their business. Interestingly, a more recent study (Kim et al. 2011) suggests that between the mid-1990s and 2010 the American public's attitudes toward polls became more negative.[31]

In addition to pollsters' efforts to study public opinion about polls, survey researchers have

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[29] As mentioned in the beginning of this article, after the 2016 presidential election, AAPOR was also concerned about the crisis in polling. For details, see Note 2.

[30] The only exception is Goyder's (1986) article, which studies the Canadian public.

[31] More recently, researchers have also analyzed people's reactions to polls in a variety of contexts. For instance, Tsfati (2001) explored Israeli citizens' trust in pre-election polls during the 1996 election, finding that most Israelis did not trust the 1996 pre-election polls. With the rise of social media and the advancement of online polling technology, more people tend to express their opinion online. Thus, scholars have been collecting data from online forums to study people's attitudes toward opinion polls (Ampofo, Anstead, and O'Loughlin 2011), or investigating directly people's trust in online polling (Kim, Weaver, and Willnat 2000).

addressed this issue within a more general framework of "survey cooperation." Underlying this literature is the same practical concern pollsters have: how to build trustful relationships between surveyor and surveyed? Scholars (Rogelberg et al. 2001) find that people's feelings about finishing surveys and perceptions of the value of surveys are associated with a number of attitudes, such as willingness to be surveyed again, following survey directions, and volunteering to participate in other surveys. Loosveldt and Storms (2008) investigate the public's attitudes toward survey value, reliability, costs, issues of privacy, and people's experiences with surveys. This scholarship suggests that respondents' negative views of surveys are associated with their willingness to answer survey questions (Stocké 2006) and past burden experiences (Stocké and Langfeldt 2004).

Overall, the literature on "polls on polls" and "surveys on surveys" draws attention to poll and survey credibility, and researchers have pointed to a seemingly increasing trend of unfavorable attitudes toward opinion polls. This scholarship, however, suffers from two related problems. First, most of these attempts primarily address the question of *what* respondents think about opinion polls rather than *why* they think the ways they do. Second, much of this scholarship focuses on individuals' attitudes toward topics concerning polling and pays no attention to social and political factors shaping their attitudes. Taken together, and despite the existence of growing negative attitudes toward polling, these two problems fail to reveal where those unfavorable opinions originate.

The Politics of Skepticism about Polling

One major assumption implicit in the literature on public opinion about opinion polls is that polling is merely a micro-level, interactive activity between pollsters and respondents. This

assumption is reflected in the practical concern most of these studies express about the trustworthiness of the opinion (e.g., Kohut 1986; Roper 1986; Schleifer 1986). Nevertheless, although the pollster's technical approaches to polling the public can affect how respondents evaluate polling, as discussed earlier, polling is an institutionalized practice in U.S. democratic politics. In this regard, citizens' perceptions of opinion polls hardly can be understood by reducing polling to transactions between surveyor and surveyed. Sociologists along with scholars from various disciplinary backgrounds have pointed to the importance of attending to the political dimension of opinion polling (Bourdieu 1979, 2015; Ginsberg 1988; Habermas 1991; Herbst 1995; Igo 2007; Shahrokni 2012). Among these writers, Bourdieu was particularly vocal in the critical examination of the politics of opinion polling. From the perspective of the sociology of knowledge, he (1979) argued that opinion polls are a political construct, which is a product that involves a number of lines of social action and most important, political interests:

> The problematics proposed by the opinion polls correspond to specific interests. Any problematic can be said to correspond to specific interests, but in this particular case the interests which support these problematics are political interests, and this fact governs both the meaning of the responses and the significance which is given to their publication. The opinion poll is, at the present time, an instrument of political action. (Bourdieu 1979:125)

According to Bourdieu's account, opinion polls are inevitably intertwined with politics. Specifically, opinion polling is one of the political instruments employed by the state in facilitating government (Ginsberg 1988). This characteristic makes the profession of opinion polling a "science" without scientists (Bourdieu 2015:168–74). This line of argument echoes the

criticism expressed by science and technology studies scholars of the relationship between science and politics (Jasanoff 2009). Similarly, other social scientists have also critically analyzed the (re)production of opinion polls within the context of democratic politics. For instance, Ginsburg (1988) and Moore (1995) highlight the question of how opinion polls are endogenous to political processes in which the state, political parties, elites, the mass media, professional pollsters, and a variety of other agents play a necessary role. Moreover, according to Herbst (1995), opinion polls are a commercialized object of political rationalization. As a commodity produced by pollsters, opinion polls are sold to the news media and politicians. This symbiosis constitutes an institutional arrangement under which opinion polls are objects co-produced by pollsters, politicians, and the news media.[32] The co-production of opinion polls is firmly embedded in the institutional networks of democratic politics. Hence, to understand citizens' skepticism about opinion polls, it is necessary to view polling as an *institution*, rather than merely an interaction between pollsters and respondents.[33]

A large body of literature examines distrust of a variety of social and political institutions. Among these institutions, the government is perhaps the one that most scholars have studied. Gamson (1968) links political trust to alienation, suggesting that public attitudes toward the government lie at the center of democratic politics. Paxton (1999) examines Americans' confidence in a number of social and political institutions, concluding that there is no evidence

[32] For a discussion about the concept of co-production, see Jasanoff (2006).

[33] This article focuses on the political dimension of opinion polling, but it should be noted that sociologists have debated the ontological and epistemological assumptions of polls and the use of polling in academic research (Blumer 1948; Manza and Brooks 2012; Perrin and McFarland 2011).

that social capital is declining in the United States. Distrust of democratic institutions, however, is common in contemporary politics. While the majority of Americans still trust the federal government, Congress, and law enforcement, the minority that lacks confidence in these institutions can be influential. Most important, a number of studies (Citrin 1974; Keele 2007; Miller and Listhaug 1990) find that pubic trust in the government is strongly affected by partisanship, which is also one of the most salient social factors for explaining people's behavior and attitudes (Baldassarri and Gelman 2008; Bartels 2000; Palfrey and Poole 1987; Slothuus and de Vreese 2010).

Social scientists have explored the role of partisanship and ideology in the issue of trust in social and political institutions. One of the institutions closely related to polling is science. As noted earlier, the professional authority of opinion polling is built on its use of the method of scientific sampling. It is reasonable to hypothesize that this characteristic factors into the general public's evaluations of the credibility of polling as an institutionalized scientific practice. Interestingly, Gauchat (2012) finds that the American public has been increasingly skeptical of the credibility of science since the 1970s. More specifically, conservative Americans have been much more distrustful of science than their liberal counterpart. Additionally, it is also found that those who go to church frequently or who are less educated are more likely to hold negative opinions on science. Gauchat (2012) argues that this growing skepticism about science is part of the rise of the new right, in which the religious right and transnational corporations are two fundamental constituents. Given that the opinion polling industry brands itself as a scientific profession, we can expect that partisanship and political ideologies also influence public trust in opinion polls.

More broadly, sociologists have documented the origins and formation of American right-

wing, anti-establishment movements (Blee and Creasap 2010; Gross, Medvetz, and Russell 2011; Perrin, Tepper, et al. 2014; Williamson, Skocpol, and Coggin 2011). The American right, which includes a variety of conservative groups, is by no means monolithic but focuses on a range of sociopolitical issues, such as abortion, religious rights, gun rights, taxation, immigration and border control. A common ground shared by neo-conservative groups is small government (except advocacy for a strong American military). In other words, the American right is more likely to be skeptical of political institutions. Horwitz (2013) argues that American anti-establishment conservatism emerged in the post-war era when right-wing intellectuals attempted to undermine liberal ideology. Neoliberal Reaganomics energized this movement in the 1980s, but it did not appear to gain momentum in the 1990s under the Clinton administration. In the twenty-first century, this anti-establishment movement culminated in the mobilization of the Tea Party and, most notably, in the 2016 presidential election. Donald Trump and his campaign strategically adopted the rhetoric of the anti-establishment, in which polling was one of the institutions towards about which the Trump campaign and conservative pundits expressed their skepticism.

In addition, the news media's symbiotic relationship with opinion polls has led it to rely heavily on polls to cover elections and campaigns, and more generally, to produce political news (Broh 1983; Herbst 1995; Salwen 1985, 1987; Welch 2002). Scholarship on public trust in the press has indicated that Americans have been more and more distrustful of institutional media (Ladd 2011). Among many possible causes, partisan horse race coverage is most related to opinion polls. The use of polls is necessary for the press to cover electoral campaigns and report which candidate is ahead or behind. This type of news coverage—"game schema"—encourages citizens' antipathy towards the press (Bennett, Lawrence, and Livingston 2008; Ladd 2011:154;

Patterson 2011). Because opinion polls are a building block of horse race journalism, the American public's evaluations of polling are expected to parallel those of the new media.

More important, partisanship and ideologies are also associated with media distrust (Ladd 2011; Lee 2010). Ladd (2011) argues that people judge the trustworthiness of the news media based on their pre-existing partisan beliefs. Because politically aware citizens are more likely to make evaluations based on partisanship and ideology (Zaller 1992), conservative Republicans are much more likely to dislike the mainstream media. One of the causes is that their evaluations of the press are largely affected by exposure to conservative elites's media criticism. For example, "liberal bias" of the mainstream media is a common criticism made by conservative pundits. In general, this line of argument is consistent with recent research on motivated skepticism—skepticism that comes from prior attitudes (Slothuus and de Vreese 2010; Taber and Lodge 2006). Thus, skepticism about polling is anticipated to be associated with the public's partisanship and ideologies.

In summary, as Bourdieu (1979) argues, issues surrounding opinion polling as an institution are inevitably political, including the public's views of polling. Research on the American public's trust in institutions such as science and the news media suggests that people's skepticism originates from party identification and political ideology. Specifically, Republicans and conservatives are more likely to be skeptical of social and political institutions. Given opinion polling's symbiotic relationship with the news media and its scientific authority, it is reasonable to expect that the American public's distrust of opinion polling also derives from partisanship and ideology.

Hypotheses

This article mainly investigates the sociopolitical origins of public skepticism about opinion polls. To explain what causes citizens to trust or distrust polling, I hypothesize that (1) partisanship and (2) ideology are the most important sociopolitical factors related to public distrust of polling. More specifically, Republicans and conservatives are hypothesized to be less likely than Democrats and liberals to trust opinion polls. Next, to situate these main hypotheses in broader social and historical context, I anticipate that other sociodemographic characteristics also affect public attitudes towards polling, including gender, race, income, education, and region.[34] Most important, I expect college educated respondents, who are more politically sophisticated, have higher odds of distrusting opinion polls. Lastly, I expect that the American public's skepticism about polling is associated with public distrust in science and the news media because polling as an institutionalized scientific profession has a symbiotic relationship with the news industry.

Data and Methods

This article analyzes data from multiple sources. First, the General Social Survey (GSS) in 1982 included two questions about opinion polling. Second, the Roper Center offers archived data from sources with information about people's attitudes toward polling. More specifically, the data on which I base my analyses come from Gallup Ad Hoc Telephone Survey #875, Gallup News Service Poll: 1996 Election Issues/Polls/Driving, Pew/PSRA Poll #1997-RESP, CBS News Poll 1998, and Gallup Poll: Baseline Study on Polls and Polling 1999, which are mostly originally from an ASCII format. These surveys were all conducted in the 1980s and 1990s.

[34] Even though there has been no theory specifying how public trust in opinion polls can be affected by these sociodemographic measures, they are commonly included in analyses of public opinion.

These comprise all the best available surveys containing both questions about opinion polls and the variables that this article needs to test its theoretical hypotheses.

Dependent Variables

Trust is understood as reflecting evaluations of (1) whether "the political actor or institutions will act in his [the public's] interests (or at least not against his interest)" (Levi and Stoker 2000:498) and of (2) "whether or not political authorities and institutions are performing in accordance with normative expectations held by the public" (Miller and Listhaug 1990:358). To operationalize public trust in opinion polling, I selected survey questions about the public's evaluations of (1) the social impact or value and (2) the accuracy of opinion polls. In other words, I measured how the public evaluates whether opinion polls perform in or against its interests (social impact or value) and in accordance with expectations (accuracy). Although these two aspects did not exhaust all the possible dimensions of people's views of opinion polling, they served as the best available measures of the credibility of polling as an institutionalized practice.

Detailed information about question wording and the ways in which the dependent variables are constructed is specified as follows. First, the GSS in 1982 asked two questions regarding the two dimensions discussed above: (1) "In general, do you feel that surveys usually serve a good purpose, or do you feel that they are usually a waste of time and money"; and (2) "how often do you think you can trust the results of surveys, do you think they are almost always right, right most of the time, only some of the time, or hardly ever right?" For question (1), three choices were offered to respondents, "good purpose," "depends," and "waste of time/money." "Don't know" and "no answer" constitute 7.4 percent of all the responses. I treated "depends" as a reference category for multinomial regression analysis. For question (2), the choices are "almost

always" (coded 3), "most of the time" (coded 2), "some of the time" (coded 1), and "hardly ever" (coded 0). "Don't know" and "no answer" constitute 5.2 percent.

Second, *Gallup Ad Hoc Telephone Survey #875*, carried out by the Gallup Organization in 1988, has a question about the accuracy of polls: "What has been their record of accuracy in elections?" Responses are "excellent" (coded 3), "good" (coded 2), "only fair" (code 1), or "poor" (coded 0). Third, *Gallup News Service Poll: 1996 Election Issues/Polls/Driving* includes a question about polling's social impact: "Do you think most opinion polls work for or against the best interests of the general public?" The responses are binary: "For" (coded 1) or "Against" (coded 0). The question about the poll accuracy is: "Some polling organizations make frequent predictions of election results. What is your general impression of how well they do—do you think they are pretty nearly right most of the time, or do you think their record is not very good?" Respondents were provided with two choices: "Right most of the time" (coded 1) or "Not very good" (coded 0).

Fourth, *Pew/PSRA Poll #1997-RESP* is a survey conducted by Princeton Survey Research Associates in 1997. The question about the impact of polling on society is "Do you think most opinion polls work for or against the best interests of the general public?" The choices are binary: "For" (coded 1) or "Against" (coded 0). The question about the poll accuracy is "Do you think that a random sample of 1,500 or 2,000 people can accurately reflect the views of the nation's population, or not?" The choices are also binary: "Yes" (coded 1) or "No" (coded 0).

Fifth, *CBS News Poll 1998* is a survey conducted by the CBS News in 1998. The question about the social value of polling is "Do you believe that polls of public opinion on issues of the day have value to the people?" The choices are binary: "Yes" (coded 1) or "No" (coded 0). Sixth, from *Gallup Poll: Baseline Study on Polls and Polling Organization Awareness* I selected four

questions regarding public trust in opinion polls. The first survey question is about the public's trust in polls in general: "Generally speaking, how much do you trust what you see or hear in the public opinion polls?" Responses offered are "a great deal" (coded 3) "a fair amount" (coded 2) "not very much" (coded 1) and "none at all" (coded 0). The second question is about the public's trust in the accuracy of polls: "Generally speaking, how would you rate the performance of public opinion polls in predicting the winner in past presidential elections?" Responses offered are "excellent" (coded 4) "very good" (coded 3), "fair" (coded 2), "poor" (coded 1), and "bad" (coded 0). The third question is about the social impact of opinion polls: "In your opinion, would the country be better off if there were…?" Choices of responses are "more attention," "less attention," and "no difference" (treated as the reference category). The fourth question is the public's responses to the question of "In your own opinion, do political officeholders and public officials pay…?" The responses are "not enough attention," "too much attention," or "right amount of attention" (treated as the reference category). The "don't know" response range from 1 to 6.5 percent of the sample.

Independent Variables

First, a number of sociodemographic variables are included: gender, race, age, education, family income, and region. Gender is coded zero for females and one for males. Race is coded zero for nonwhites and one for whites. Age is a continuous variable measured by years. Family income is a self-reported measure in dollars divided by one thousand. Education is a categorical variable in which the reference category is high school education or less, and the other college education (including some college, bachelor, and graduate school). Region is coded into Northeast (the reference category), Midwest, South, and West. Second, the two key independent variables in the

analysis of this article are partisanship and political ideology. Partisanship is measured by a categorical variable coded into Democrat (the reference category), Republican, and Independent. Political ideology is also a categorical variable coded into liberal (the reference category), conservative, and moderate.

Additional Independent Variables

I also included two additional independent measures from the 1982 GSS: (1) pubic trust in the press and (2) public trust in science. Public trust is the press is measured by respondents' responses to the question about the respondent's confidence on the news media. Public trust in science is measure by responses to the question about the respondent's confidence on the scientific community. The responses to the both question are a continuous scale 6 (complete confident) to 0 (not confident at all). These two measures were only included in an additional analysis of the dependent variable—public trust in the accuracy of polls—constructed from the GSS 1982 data.

Analytic Strategies

To analyze sociopolitical origins of the public's evaluations of credibility of opinion polls, I take two steps. First, I present the statistical distributions of responses to the survey questions about the public's trust in opinion polls. Second, to analyze whether partisanship, ideology, and other sociodemographic factors affect the outcome variables, I fit logistic, ordinal logistic, or multinomial logistic regression models to estimate the independent variables' effects on the dependent variables, depending on the nature of the responses to the questions.

Results

(Figure1 and Table 1 here)

I begin by examining general patterns of the public's trust in opinion polls. Figure 1 shows the distribution of responses to survey questions about the credibility of polls. Figure 1a demonstrates that about 46 percent of the public have a fair degree of trust in public opinion polls. While about 34 percent do not have very much trust in polls, only 16 percent have a great deal of trust in polls. Figure 1b shows that nearly half of the general public (48 percent) trust opinion polls in predicting presidential election outcomes. However, there are also about 42 percent of citizens who think opinion polls poorly or badly predict winners in presidential elections. Less than 10 percent think the performance of polls in predicting electoral outcome is excellent (4 percent) or very good (5.5 percent).

To further understand these patterns, I employed ordinal logit models to examine what predicts citizens' trust in opinion polls (see Table 1). Model 1 in Table 1 demonstrates that older people are significantly less likely to trust polling. But the effect of age is non-linear in that the effect of age squared is positive and significant (at .05 level). Interestingly, Model 1 also shows that respondents with college-level education have 33 percent lower odds of trusting opinion polls (exp[-0.41]=0.67). Moreover, Republicans are nearly 50 percent significantly less likely than Democrats to trust opinion polls (exp[-0.659]= 0.51), and Independents are 68 percent significantly less likely than Democrat to trust opinion polls in general. Conservatives are 58 percent significantly less likely than liberals to trust opinion polls (exp[-0.862]= 0.42), and moderates are 44 percent significantly less likely than liberals to trust polls (exp[-0.583]= 0.56). Model 2 presents findings only slightly different from Model 1. When it comes to the question about the accuracy of opinion polls in prediction election outcome, college educated citizens are

significantly more likely to trust polls. However, similar to the results of Model 1, Model 2 shows that both Republicans and Independents have lower odds than Democrats of trusting the accuracy of polls. Moreover, conservatives are 53 percent significantly less likely than liberals to trust the accuracy of polls in predicting presidential election outcomes (exp[-0.753]=0.47). Taken together, Modes 1 and 2 in Table 1 demonstrate that, after accounting for other sociodemographic characteristics, self-identified Republicans and Independents as well as conservatives and moderates have lower likelihood of trusting opinion polls. College educated respondents also have lower odds of trusting polling in general, although they have greater odds of being favorable to the poll accuracy. These findings lend strong support to my hypotheses..

(Figure 2 and Table 2 here)

With regard to the American public's assessments of social values of polling, Figure 2 shows the distribution of citizens' responses to the survey question about this dimension. About 76 percent of the American public think polls or surveys serve a good purpose, about 15 percent think it depends, and only less than 9 percent think polls are a waste of time and money. Table 2 presents results of multinomial logistic regression analysis of these three responses with "depends" as the reference category. Several findings are worth noting. First, for the college educated public, the likelihood of viewing opinion polling as a waste of time and money and the one of viewing polling as serving a good purpose are the same. Second, even though Republicans are significantly less likely than Democrats to be either negative or positive about the social value of polling, they have lower odds of being positive (log odds = -0.148) than being negative (log odds = -0.017). Third, Independents are 37 percent (exp[0.318]=1.37) significantly more likely than liberals to be unfavorable to the social values of polling, and are 13 percent (exp[-0.13]=0.87) significantly less likely to be favorable. Fourth, similarly, conservatives and moderates have

significantly greater odds than their liberal counterparts of being negative about the value of opinion polls, and significantly lower odds of being positive. In summary, similar to results in Table 1, Table 2 shows that Republicans and Independents as well as conservatives and moderates are less likely to trust opinion polls. Citizens with college educational backgrounds are also less likely to be positive about the value of polling. These findings also support my hypotheses.

(Figure 3 and Table 3 here)

With respect to the public's evaluations of the impact of polling, Figure 3 shows the distribution of responses to the related survey questions. Figure 3a indicates that nearly 6-in-10 respondents agree that the country would be better off if less attention is paid to opinion polls, compared to that only 1-in-3 think more attention to polls would make the country better. Figure 3b shows that nearly 60 percent of the American public thinks public officials pay too much attention to polls, and less than 40 percent thinks think officeholders do not pay enough attention to polls.

Table 3 shows the results of multinomial logistic regression analyses of the responses to those questions. Several findings related to my hypotheses are worth noting. First, in Model 1, respondents with college-level educational backgrounds are significantly less likely to opine that the country would be better off if either more attention or less attention paid to opinion polls. But the likelihood of favoring more attention paid to polls (log odds = -1.144) is lower than the one of favoring less attention (log odds = -0.297). Similarly, in Model 2, while college educated respondents are significantly more likely to think public officials pay either not enough or too much attention to opinion polls, the likelihood of favoring more attention should be paid to polls by public officials (log odds = 0.09) is lower than favoring less attention (log odds = 0.569).

Second, in both Models 1 and 2, although Republicans are shown to be significantly more likely than Democrats to think either more attention or less attention should be given to opinion polls, the odds of favoring more attention (log odds = 0.318 in Model 1 and 0.827 in Model 2) is lower than favoring less attention (log odds = 0.716 in Model 1 and 1.628 in Model 2). Independents have a similar pattern of responses. Third, among conservatives or moderates, as Model 1 of Table 3 shows, more respondents support less attention should be paid to polls in order to make the country better; as Model 2 indicates, conservatives and moderates are significantly less likely to respond that not enough attention is given to polls. By contrast, they are significantly more likely to think that too much attention is paid to polls. To summarize, these findings indicate that, college educated citizens, Republicans and Independents, and conservatives and moderates have greater likelihood of being negative about the social impact of opinion polls.

(Tables 4 and 5 here)

Table 4 presents the results of logistic regression analysis of the public's responses to questions about the social impact or value of opinion polling. One can see that Models 1, 2, and 3 of Table 4 demonstrate a more or less similar pattern: Republicans and Independent, and conservatives and moderates are less likely to be favorable to the social impact or value of polls. Table 5 show the results of logistic regression analysis of citizens' evaluations of poll accuracy. A noticeable finding is that conservatives have lower likelihood of being favorable to the accuracy of polling. In short, findings in Tables 4 and 5 are generally consistent with the results presented in Tables 1, 2, and 3, and generally lend support to my hypotheses.

(Table 6 here)

Finally, I examine the effects of public confidence in science and the press on the American public's trust in opinion polls. Model 1 in Table 6 shows that conservatives are less likely than

liberals to trust the accuracy of polls, although not statistically significant. Model 2 in Table 6 adds the measure of trust in the press, which is significantly positively associated with trust in polls. Model 3 adds the measure of public confidence on scientific communities, which is also significantly positively associated with public trust in opinion polls. Model 4 includes both measures, showing very consistent results. Taken together, results in Tables 6 lend strong support to the argument that polling as an institutionalized scientific profession has a symbiotic relationship with the news media. By situating polling in broader social and institutional contexts, this finding helps us better understand the American public's skepticism about opinion polls.

Discussion and Conclusions

This article extends existing research on public trust in social and political institutions by focusing on the politics of public skepticism about opinion polls. Polling is an institutionalized practice in American democratic politics. Although previous attempts to examine public opinion about polling have indicated a decline of trust in opinion polls, scant attention has been paid to the broader social and political contexts in which trust and distrust are emerging and (re-)produced. Motivated by scholarship on public skepticism about science and the news media, which are closely related to polling, and following Bourdieu's (1979) argument that polling is political in character, I analyze how partisanship and ideologies affect citizen's evaluations of the credibility of opinion polls. I find that the American public's trust in opinion polling is strongly influenced by party identification and ideology. While the majority trust opinion polls, Republicans, conservatives, and moderates are significantly less likely to trust opinion polls. Furthermore, political awareness—measured by college education—is also significantly associated with citizens' distrust of polling. Finally, I find that the American public's trust in

polling is strongly associated with their confidence in the news media and science.

The limitations of this article are twofold. First, lacking data, my analyses do not cover the 2000s. We know that public trust in polling is lower in the 2000s (Kim et al. 2011), but it is unknown whether partisanship and ideologies shape the public's evaluations of opinion polls in twenty-first century America. Second, although the results show that college-educated respondents, Republicans, conservatives, and moderates are more likely to distrust polling, more research is needed to better understand the process by which the skepticism about opinion polling forms and takes shape. In the case of media distrust, it is exposure to alternative media outlets, such as political talk radio or online blogs, that gives rise to the formation of skepticism about the press among politically aware Republicans and conservatives (Ladd 2011). However, the data analyzed in this study do not allow me to test similar hypotheses.

This article primarily contributes to the scholarship on public trust in democratic countries. As a profession with scientific authority, polling is neither a "hard" science nor type of "high" technology that makes people worry about the risks it likely brings about. Instead, opinion polls are a kind of social knowledge produced by pollsters who carry out surveys, and the use of polls is primarily linked to the media coverage of elections. Thus, this article's core finding that the public's skepticism about opinion polls is deeply rooted in the Republican identity and conservatism presents a case for better understanding the role of trust in opinion polling in polarized American politics.

What consequences does the distrust of polling bring about? If opinion polls are meant to represent the public's voice and are always expected to meet this requirement, then the skepticism about them that is mainly shaped along partisan and ideological lines is alarming for democracy. Even though partisan biases and motivated reasoning are common in American

political life (Slothuus and de Vreese 2010), the distrust of polling in politics may engender a crisis of democratic institutions. Scholars have argued that distrust of the news media has profound impact on voting behavior, further reinforcing the polarization the American public (Ladd 2011; Levendusky 2013). In this regard, if the American public's attitudes toward opinion polls are differentiated along partisan and ideological lines, the polarization of American democracy may be heightened, resulting in a more divided public.

For example, during the 2016 presidential election, opinion polls as always were extensively employed by media outlets to predict the election outcome and most of them failed to foresee a Trump presidency. After this fiasco, Trump supporters—who are mostly conservatives and Republicans, have been critical of the news media's liberal bias (Ladd 2011), and are skeptical of opinion polls—may become more distrustful of the political system. This consequence may have ripple effects, which would engender more polarized public opinion about other social issues and political institutions, potentially leading to a crisis of democracy.

More generally, this article offers a lens through which we can better grasp the rise of neo-conservatism in the United States. Although recently scholars have pointed to the popular origin of the American right—the alienation of the white working class as the silent majority (Hochschild 2018)—my analysis suggests it is the college-educated Republican and conservative as the vocal minority that talks back to the institution of political polling. This finding is in line with sociological accounts of neo-conservative movements.[35] Sociologists (Williamson et al. 2011) have argued that Tea Partiers' conservative activism is supported and funded by wealthy

[35] It should be noted that this article does not tend to simplify American conservatism or treat it as a monolithic ideology. For this argument, see Perrin at al (2014).

Republican elites and their allied news media network.[36] Research on right-wing movements has also pointed out that what lies at the core of right-wing ideology is a well-crafted conservative discourse by elites and intellectuals (Gross et al. 2011; Horwitz 2013). Therefore, public skepticism about opinion polls is a piece of the puzzle about American neo-conservatism.

Citizens who are distrustful of opinion polls can have momentous consequences, especially when they are privileged, educated, or politically sophisticated. To be influential, these citizens are not only willing but also able to organize and mobilize grass-root networks, articulate discourses based on conservative ideology, and cooperate with like-minded politicians—mostly Republicans (Williamson et al. 2011). For example, in the 2016 presidential election, Trump supporters' animosity toward the political establishment and the news media may have been heightened by the rhetoric of the Trump campaign, which deliberately described democratic institutions, including opinion polling, as "rigged," "dishonest," or "fake."

More broadly, my findings also have critical implications for a normative theory of democracy. Habermas (1994) distinguishes between liberal, republican, and deliberative democracy. While he does not specifically theorize the relationship between polling and these three models, it is reasonable to perceive opinion polling as indispensable for the liberal model—the model of American democracy. The liberal democratic model has major flaws: the undemocratic nature of aggregated private opinions and interests. If the validity of the link between opinion polling and liberal democracy is based on attention to the question of who gets represented (Enns and Wlezien 2011), then distrust of opinion polls will only delegitimize the American democratic system. This skepticism about polling, along with other anti-establishment sentiments, may bring about right-wing populist activism, which will likely result in the genesis

[36] For an account of the cultural root of the Tea Party's rise, see (Perrin, Tepper, et al. 2014)

of strongman authoritarianism.

The discussion above, however, does not suggest jettisoning opinion polling. Instead, future research should investigate the possible outcomes to which skepticism about polling gives rise. For example, it is worth further exploring whether distrust of polling alters voting behavior and political participation, and if it is associated with political alienation. Moreover, since existing research on public opinion about polling takes a survey approach, more qualitative, in-depth studies are needed to reveal how publics think about and react to opinion polls in a wide range of social and political contexts. After all, opinion polling has been institutionally indispensable to American democracy. Better understanding citizen distrust of it can ultimately help us answer the question of whether democracy itself is capable of preventing the potential threats posed by skepticism about opinion polls.

Table 1: Ordinal Logit Models Predicting Public Trust in Polls

	Model 1 Trust in polls in general	Model 2 Trust in accuracy of polls
Male	0.144	0.315*
	(0.146)	(0.149)
White	-0.074	0.375
	(0.205)	(0.209)
Income	0.00000	0.00000
	(0.00000)	(0.00000)
Age	-0.043*	0.036
	(0.021)	(0.021)
Age^2	0.0005*	-0.0003
	(0.0002)	(0.0002)
College	-0.410*	0.417*
	(0.160)	(0.165)
Republican	-0.659***	-0.205
	(0.171)	(0.172)
Independent	-1.138***	-0.878**
	(0.248)	(0.272)
Conservative	-0.862***	-0.753***
	(0.215)	(0.218)
Moderate	-0.583**	-0.340
	(0.198)	(0.197)
Midwest	0.172	0.011
	(0.204)	(0.208)
South	0.011	-0.434*
	(0.195)	(0.201)
West	-0.341	-0.491*
	(0.210)	(0.216)
Observations (N)	717	688
Log Likelihood	-756.627	-761.378

Source: Gallup Poll: Baseline Study on Polls and Polling Organization Awareness (1999).
Note: Coefficients are log odds. Numbers in parentheses are standard errors. In Model 1, the dependent variable is the public's responses to the question of "Generally speaking, how much do you trust what you see or hear in the public opinion polls?" The responses are "a great deal" (coded 3), "a fair amount" (coded 2), "not very much" (coded 1), or "none at all" (coded 0). In Model 2, the dependent variable is the public's responses to the question of "Generally speaking, how would you rate the performance of public opinion polls in predicting the winner in past presidential elections?" The responses are "excellent," (coded 4) "very good," (coded 3) "fair,"

(coded 2) “poor,” (coded 1) or “bad” (coded 0).
$^{*}p<0.05$; $^{**}p<0.01$; $^{***}p<0.001$ (two-tailed tests)

Table 2: Multinomial Logit Models Predicting Public Responses to Questions about the Social Impact of Polling

	Waste of time and money	Serve a good purpose
Male	-0.141***	0.002***
	(0.0001)	(0.0001)
White	-0.322***	0.111***
	(0.0003)	(0.0003)
Income	0.00000	-0.00000
	(0.00001)	(0.00001)
Age	0.047***	0.010
	(0.012)	(0.010)
Age^2	-0.0005**	-0.0002
	(0.0002)	(0.0001)
College	-0.056***	-0.056***
	(0.0001)	(0.0001)
Republican	-0.017***	-0.148***
	(0.0001)	(0.0001)
Independent	0.318***	-0.130***
	(0.0001)	(0.0001)
Conservative	0.050***	-0.060***
	(0.0001)	(0.0001)
Moderate	0.004***	-0.038***
	(0.0002)	(0.0002)
Midwest	0.095***	-0.320***
	(0.0002)	(0.0001)
South	-0.250***	-0.080***
	(0.0001)	(0.0001)
West	-0.108***	-0.215***
	(0.0001)	(0.0001)
Constant	-0.275***	2.465***
	(0.001)	(0.0004)
Observations (N)	1,568	1,568
Akaike Inf. Crit.	2,182.968	2,182.968

Source: General Social Survey (1982).
Note: Coefficients are log odds. Numbers in parentheses are standard errors. The dependent variable is the public's responses to the question of "In general, do you feel that surveys usually…?" The responses are "waste of time and money," "depends," or "serve a good purpose." The reference response category is "depends."
*p<0.05; **p<0.01; ***p<0.001 (two-tailed tests)

Table 3: Multinomial Models Predicting Public Responses to Questions about the Impact of Polling on Government

	Model 1		Model 2	
	More attention	Less attention	Not enough attention	Too much attention
Male	-0.174***	-0.235***	-1.068***	-0.754***
	(0.0001)	(0.0001)	(0.0001)	(0.0001)
White	-0.478***	-0.009***	-1.278***	-0.867***
	(0.0002)	(0.0002)	(0.0002)	(0.0002)
Income	-0.00003***	-0.00001**	-0.00001	-0.00000
	(0.00000)	(0.00000)	(0.00001)	(0.00001)
Age	0.073***	0.145***	-0.089***	-0.013*
	(0.006)	(0.006)	(0.006)	(0.006)
Age^2	-0.001***	-0.002***	0.001***	-0.00002
	(0.0001)	(0.0001)	(0.0002)	(0.0002)
College	-1.144***	-0.297***	0.090***	0.569***
	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Republican	0.138***	0.716***	0.827***	1.628***
	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Independent	-0.100***	0.778***	12.686***	12.830***
	(0.00004)	(0.00004)	(0.00004)	(0.00004)
Conservative	0.239***	0.949***	-0.326***	0.334***
	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Moderate	0.988***	1.307***	0.385***	0.780***
	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Midwest	0.010***	0.004***	0.391***	0.204***
	(0.00005)	(0.00005)	(0.00005)	(0.00005)
South	0.430***	0.433***	-0.630***	-0.721***
	(0.0001)	(0.0001)	(0.0001)	(0.0001)
West	-0.007***	0.305***	-0.185***	0.309***
	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Constant	2.888***	-0.770***	7.667***	4.262***
	(0.0002)	(0.0002)	(0.0002)	(0.0002)
Observations (N)	689	689	695	695
Akaike Inf. Crit.	1,057.004	1,057.004	966.819	966.819

Source: Gallup Poll: Baseline Study on Polls and Polling Organization Awareness (1999).
Note: Coefficients are log odds. Numbers in parentheses are standard errors. In Model 1, the dependent variable is the public's responses to the question of "In your opinion, would the country be better off if there were…?" The responses are "more attention," "less attention," or

"no difference." The reference category is "no difference." In Model 2, the dependent variable is the public's responses to the question of "In your own opinion, do political officeholders and public officials pay…?" The responses are "not enough attention," "too much attention," or "right amount of attention." The reference category is "right amount of attention."
$^{*}p<0.05$; $^{**}p<0.01$; $^{***}p<0.001$

Table 4: Logit Models Predicting Public Evaluations of the Social Impact or Value of Opinion Polling (1=Favorable; 0=Unfavorable)

	Model 1 Gallup 1996	Model 2 Pew/PSRA 1997	Model 3 CBS News 1998
Male	-0.083	-0.461***	0.321
	(0.176)	(0.113)	(0.172)
White	0.119	0.334*	-0.380
	(0.253)	(0.147)	(0.271)
Income	0.010*	0.001	-0.0002
	(0.004)	(0.002)	(0.004)
Age	-0.068*	-0.011	-0.017
	(0.029)	(0.016)	(0.024)
Age^2	0.0005	-0.00004	0.0001
	(0.0003)	(0.0002)	(0.0002)
College	-0.039	-0.287*	-0.324
	(0.190)	(0.120)	(0.182)
Republican	-0.737**	-0.330*	-0.244
	(0.224)	(0.153)	(0.211)
Independent	-0.636**	-0.320*	0.069
	(0.236)	(0.140)	(0.217)
Conservative	0.137	-0.482**	-0.615*
	(0.263)	(0.169)	(0.246)
Moderate	0.315	-0.182	-0.174
	(0.241)	(0.160)	(0.225)
Midwest	-0.036	-0.001	0.072
	(0.265)	(0.160)	(0.233)
South	-0.169	0.301	0.676**
	(0.235)	(0.155)	(0.233)
West	-0.277	0.264	0.267
	(0.254)	(0.177)	(0.253)
Constant	3.057***	2.302***	1.876**
	(0.729)	(0.420)	(0.660)
Observations (N)	828	2,047	782
Akaike Inf. Crit.	867.436	2,083.437	910.240

Source: Gallup News Service Poll: 1996 Election Issues/Polls/Driving, Pew/PSRA Poll #1997-RESP, and CBS News Poll 1998.

Note: Coefficients are log odds. Numbers in parentheses are standard errors. In Model 1, the dependent variable is binary responses to the question of "Do you think most opinion polls work for or against the best interests of the general public?" In Model 2, the dependent variable is

binary responses to the question of “Do you think most opinion polls work for or against the best interests of the general public?” In Model 3, the dependent variable is binary responses to the question of “Do you believe that polls of public opinion on issues of the day have value to the people?”

$^{*}p<0.05$; $^{**}p<0.01$; $^{***}p<0.001$

Table 5: Logit Models Predicting Public Evaluations of the Accuracy of Opinion Polling (1=Favorable; 0=Unfavorable)

	Model 1 Gallup 1988	Model 2 Gallup 1996	Model 3 Pew/PSRA 1997
Male	-0.086	-0.098	0.079
	(0.139)	(0.163)	(0.095)
White	0.599**	0.567**	0.065
	(0.202)	(0.217)	(0.124)
Income	0.000001	0.020***	-0.0001
	(0.00000)	(0.004)	(0.002)
Age	0.035	-0.020	0.007
	(0.022)	(0.026)	(0.014)
Age^2	-0.0004*	0.0001	-0.0001
	(0.0002)	(0.0003)	(0.0001)
College	0.456**	-0.269	-0.107
	(0.149)	(0.175)	(0.099)
Republican	0.214	-0.254	0.149
	(0.152)	(0.206)	(0.128)
Independent	-0.224	-0.309	0.030
	(0.265)	(0.221)	(0.113)
Conservative	-0.254	-0.366	-0.425**
	(0.230)	(0.246)	(0.135)
Moderate	-0.090	0.142	-0.309*
	(0.165)	(0.226)	(0.122)
Midwest	0.033	-0.005	-0.108
	(0.199)	(0.244)	(0.138)
South	-0.028	-0.235	0.096
	(0.190)	(0.217)	(0.128)
West	-0.234	-0.157	-0.129
	(0.205)	(0.244)	(0.149)
Constant	--	0.965	-0.614
	--	(0.629)	(0.345)
Observations (N)	816	854	2,227
Akaike Inf. Crit.	-807.740	979.394	2,776.894

Source: Gallup Ad Hoc Telephone Survey #875, Gallup News Service Poll: 1996 Election Issues/Polls/Driving, and Pew/PSRA Poll #1997-RESP

Note: Coefficients are log odds. Numbers in parentheses are standard errors. Mode 1 is an ordered logit model. In Model 1, the dependent variable is responses to the question of "What

has been their record of accuracy in elections--excellent, good, only fair, or poor?" In Model 2, the dependent variable is binary responses to the question of "Some polling organizations make frequent predictions of election results. What is your general impression of how well they do—do you think they are pretty nearly right most of the time, or do you think their record is not very good?" In Model 3, the dependent variable is binary responses to the question of "Do you think that a random sample of 1,500 or 2,000 people can accurately reflect the views of the nation's population, or not?"
$p<0.05$; $^{**}p<0.01$; $^{***}p<0.001$

Table 6: Ordinal Logit Models With Measures of Trust in the Press and/or Science Predicting Public Trust in the Accuracy of Polls

	Model 1	Model 2	Model 3	Model 4
Male	0.169	0.215	0.022	0.084
	(0.155)	(0.158)	(0.165)	(0.167)
White	-0.00001	-0.00001	-0.00001*	-0.00001*
	(0.00000)	(0.00000)	(0.00000)	(0.00000)
Income	-0.003	-0.041	-0.148	-0.165
	(0.097)	(0.098)	(0.102)	(0.103)
Age	0.016	0.014	0.009	0.009
	(0.016)	(0.017)	(0.018)	(0.018)
Age^2	-0.0002	-0.0002	-0.0001	-0.0001
	(0.0002)	(0.0002)	(0.0002)	(0.0002)
College	0.0001	-0.013	-0.061	-0.055
	(0.108)	(0.109)	(0.112)	(0.112)
Republican	0.097	0.165	0.066	0.118
	(0.111)	(0.114)	(0.117)	(0.119)
Independent	-0.065	-0.004	-0.015	0.040
	(0.149)	(0.152)	(0.161)	(0.162)
Conservative	-0.113	-0.087	-0.064	-0.011
	(0.130)	(0.131)	(0.137)	(0.138)
Moderate	0.063	0.050	0.085	0.092
	(0.122)	(0.123)	(0.127)	(0.128)
Midwest	-0.138	-0.175	-0.115	-0.126
	(0.114)	(0.115)	(0.119)	(0.120)
South	0.101	0.116	0.139	0.168
	(0.148)	(0.150)	(0.156)	(0.157)
West	0.078	0.063	0.072	0.090
	(0.149)	(0.150)	(0.154)	(0.155)
Trust in Press	--	0.463***	--	0.383***
	--	(0.079)	--	(0.084)
Trust in Science	--	--	0.503***	0.405***
	--	--	(0.088)	(0.091)
Observations (N)	1,616	1,595	1,488	1,477
Log Likelihood	-1,709.182	-1,661.346	-1,550.380	-1,525.393

Source: General Social Survey (1982).
Note: Coefficients are log odds. Numbers in parentheses are standard errors. The question is: "How often do you think you can trust the results of surveys?" The responses are "almost always

right" (coded 3), "right most of the time" (coded 2), "only some of the time" (coded 1), or "hardly ever right" (coded 0). The measure of trust in press is based on the question of
$^{*}p<0.05$; $^{**}p<0.01$; $^{***}p<0.001$

Figure 1: Distributions of Responses to Survey Questions about Trust in Public Opinion Polls

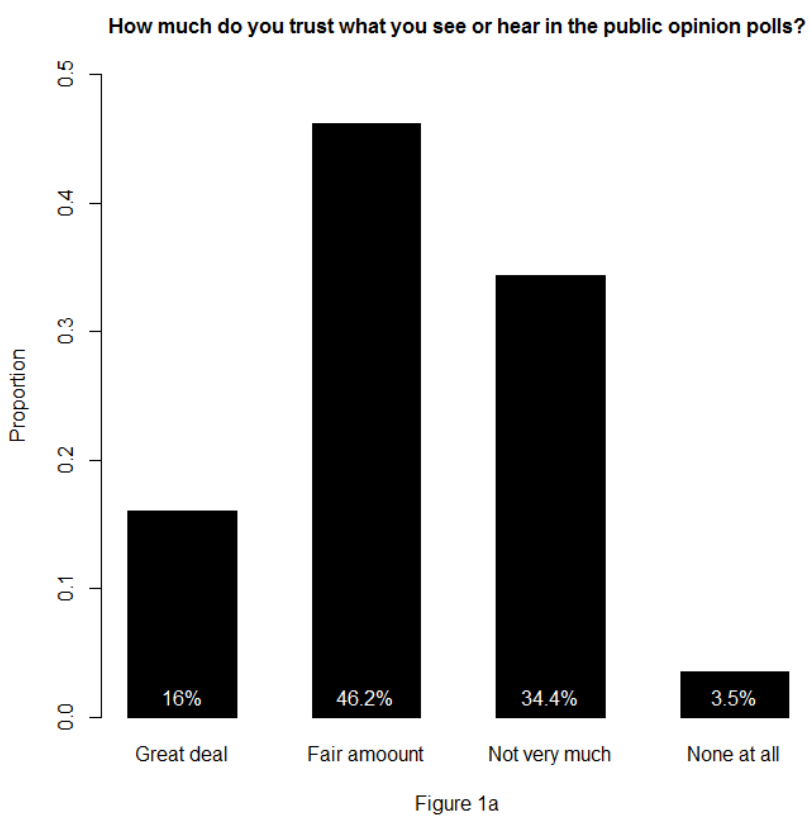


Figure 1a

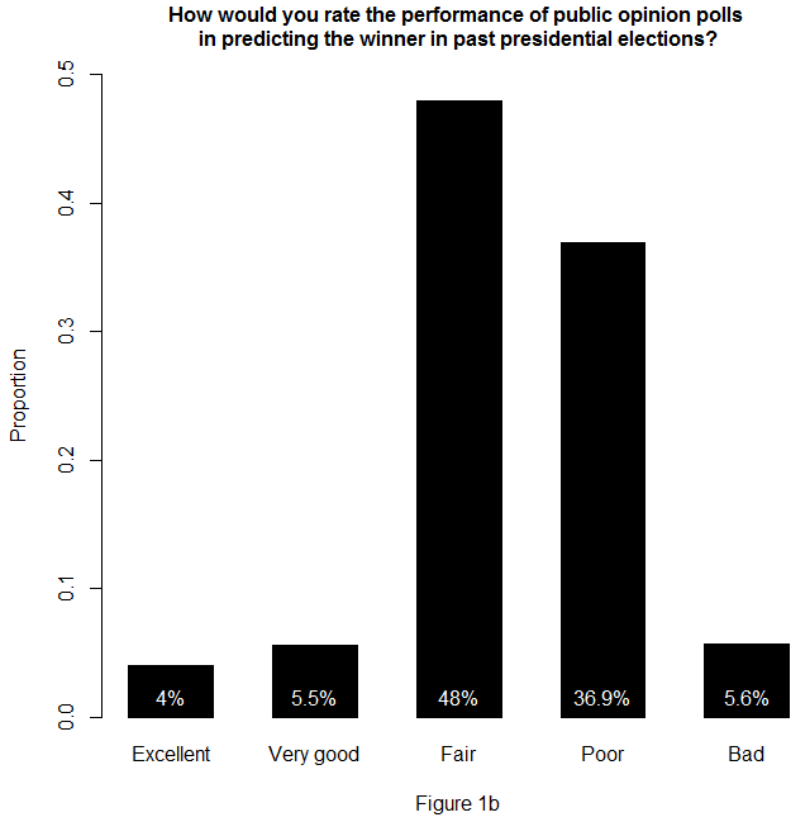
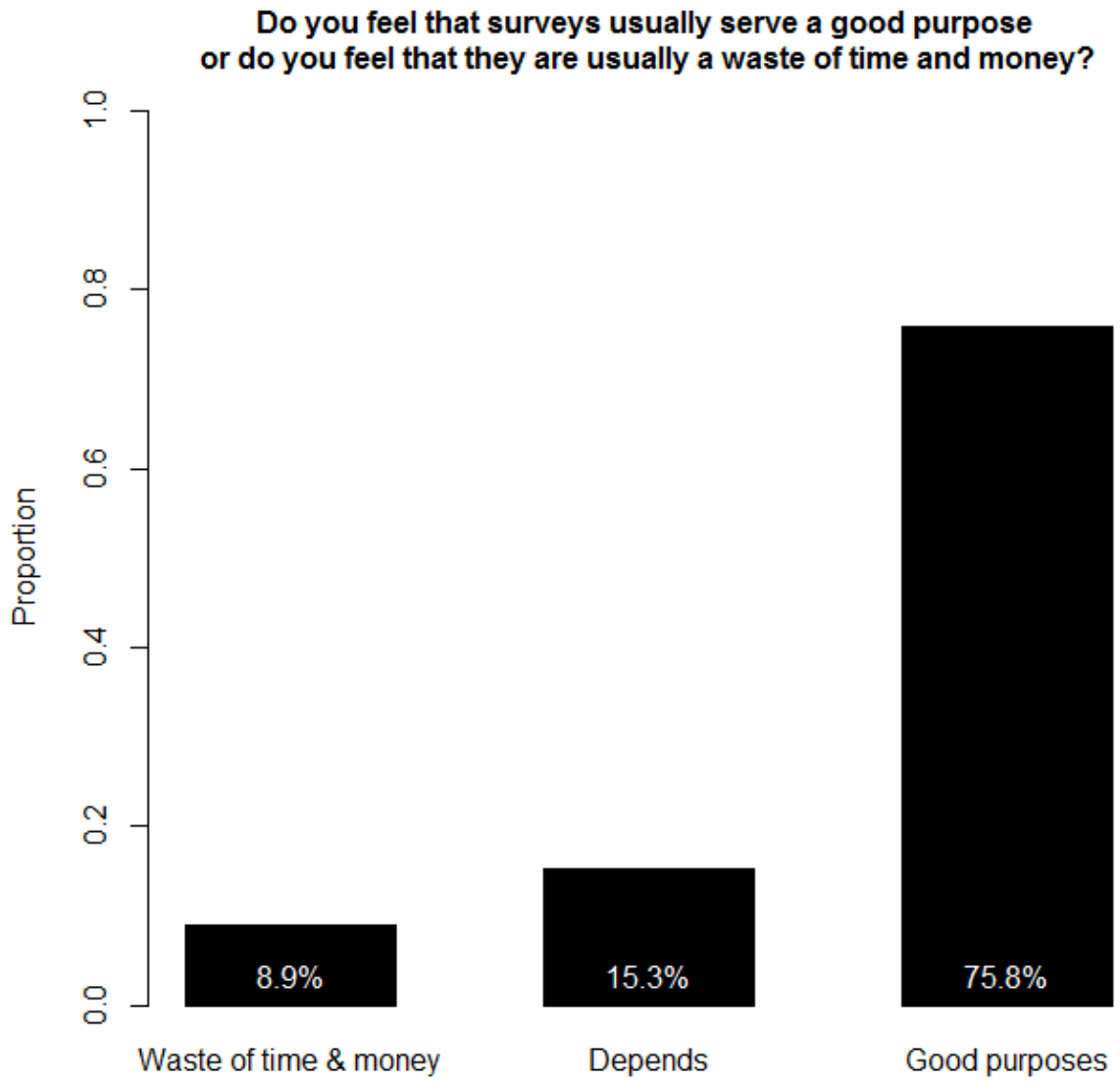


Figure 1b

Source: Gallup Poll: Baseline Study on Polls and Polling Organization Awareness (1999).
Note: Figure 1a, the question is: "Generally speaking, how much do you trust what you see or hear in the public opinion polls?" The responses are "a great deal," "a fair amount," "not very much," or "none at all." In Figure 1b, the question is: "Generally speaking, how would you rate the performance of public opinion polls in predicting the winner in past presidential elections?" The responses are "excellent," "very good," "fair," "poor," or "bad."

Figure 2: Distributions of Responses to Survey Questions about Social Value of Public Opinion Polls



Source: General Social Survey (1982).
Note: The question is "In general, do you feel that surveys usually…?" The responses are "waste of time and money," "depends," or "serve a good purpose."

Figure 3: Distributions of Responses to Survey Questions about Social Impact of Public Opinion Polls

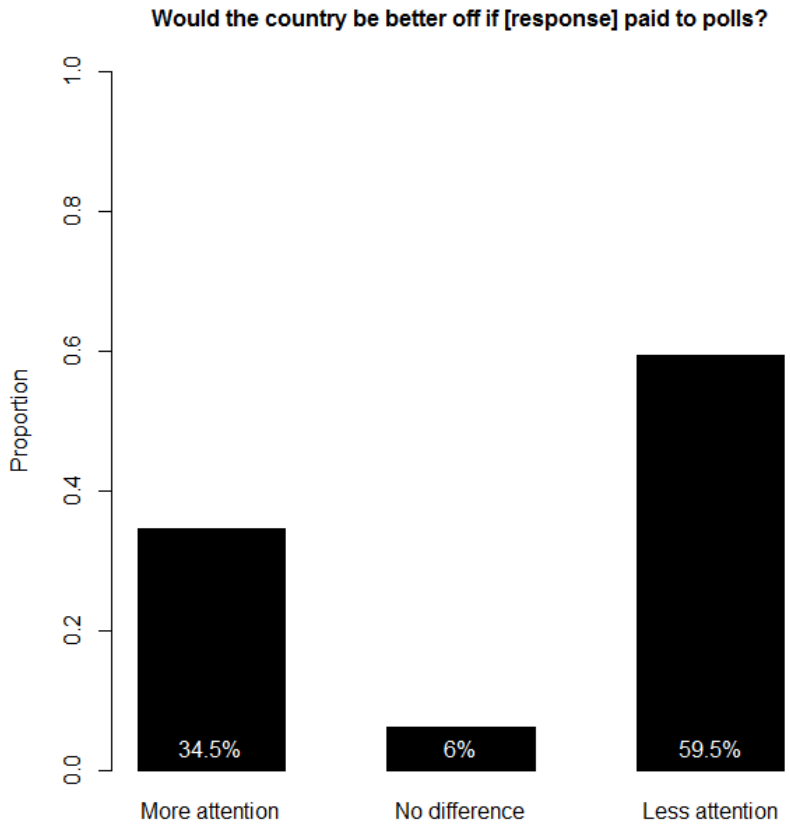


Figure 3a

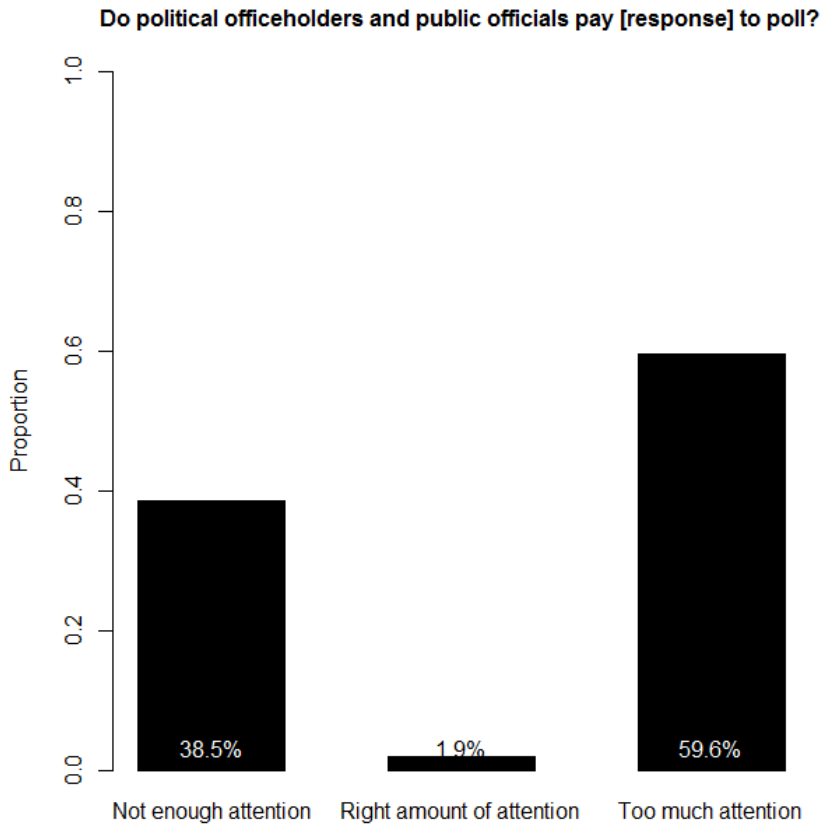


Figure 3b

Source: Gallup Poll: Baseline Study on Polls and Polling Organization Awareness (1999).
Note: In Figure 3a, the question is: "In your opinion, would the country be better off if there were [response] paid to polls?" The responses are "more attention," "less attention," or "no difference." In Figure 3b, the question is: "In your own opinion, do political officeholders and public officials pay [response] to polls?" The responses are "not enough attention," "too much attention," or "right amount of attention."

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